# ASSESSING POETRY MARKUP WITH NUSCHOLAR

by

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**TABLE OF CONTENTS**

**LIST OF TABLES** ..... **viii**

**LIST OF FIGURES** ..... **ix**

**ABSTRACT** ..... **xi**

**ACKNOWLEDGEMENTS** ..... **xii**

**CHAPTER 1 INTRODUCTION** ..... **1**

1.1 Benefits of Digital Scansion Tool ..... 3

1.2 Motivation ..... 5

1.3 Thesis Contribution ..... 6

1.4 Solution Overview ..... 6

1.4.1 Requirement Gathering ..... 6

1.4.2 Design and Implementation ..... 7

1.4.3 In situ Evaluation ..... 8

1.5 Thesis Roadmap ..... 9

**CHAPTER 2 BACKGROUND AND RELATED WORK** ..... **11**

2.1 E-Learning ..... 11

2.1.2 Guidelines Considered for NUScholar ..... 13

2.2 Annotation ..... 14

2.3 Scansion ..... 17

2.4 “For Better for Verse” ..... 23

2.4.1 Scansion Task ..... 23

2.4.2 Poems To Scan ..... 23

2.4.3 Meter Identification ..... 23

2.4.4 Additional Features ..... 24

2.4.5 Glossary and Instructions ..... 24

2.4.6 Limitations of “For Better For Verse” ..... 25

2.4.7 How “For Better for Verse” could be better integrated into the practice of teaching with computers? ..... 26

2.5 Summary ..... 27

**CHAPTER 3 REQUIREMENT GATHERING ..... 29**
3.1 Research Objectives ..... 30
3.2 Study Design ..... 30
3.3 Results ..... 32
3.3.1 Type of Application ..... 32
3.3.2 Scansion Marks Required and their Availability ..... 32
3.3.3 Appearance of the Poem ..... 33
3.3.4 Requirements for Saving the Poem ..... 34
3.3.5 Checking the Accuracy of Marked Poem ..... 35
3.3.6 Choosing a Poem to Scan ..... 35
3.3.7 Dictionary ..... 36
3.3.8 Other Features Required ..... 37
3.3.8.1 Ability to Correct Mistakes ..... 37
3.3.8.2 Audio Version of Poems ..... 37
3.3.8.3 Color Blocking the Stanzas ..... 37
3.3.8.4 Adding Notes and Comments ..... 38
3.3.8.5 Highlight ..... 38
3.3.8.6 Print ..... 38
3.3.8.7 System Asking Poem-Specific Questions ..... 39
3.3.8.8 Chat/ Discussion ..... 39
3.3.8.9 Concordance ..... 39
3.3.8.10 Caesura ..... 39
3.3.8.11 Enjambment ..... 40
3.3.8.12 Automatic Meter and Feet Substitution Identification ..... 40
3.3.8.13 Grading and Marking for Teachers ..... 40
3.3.8.14 Line Numbers for Poem Lines ..... 40
3.3.8.15 Audio for Different Accentual Syllabic Values ..... 40
3.3.8.16 Glossary ..... 40
3.4 Limitations of the Study ..... 42

3.5 What Could Have Been Done Differently? ..... 43
**CHAPTER 4 DESIGN AND IMPLEMENTATION ..... 44**
4.1 Design ..... 44
4.1.1 Scanning ..... 44
4.1.2 Undo ..... 50
4.1.3 Finding the meter ..... 52
4.1.4 Getting Reviews on Scansion ..... 54
4.1.5 Flexibility to Choose Poem ..... 56
4.1.6 Save and Print ..... 58
4.1.7 AutoSave ..... 61
4.1.8 Dictionary ..... 61
4.1.9 Glossary ..... 63
4.2 Implementation ..... 63
4.2.1 Syllable Representation, Selection and Marking ..... 64
4.2.2 Finding the Meter in the Line ..... 66
4.2.3 Undo ..... 69
**CHAPTER 5 FIELD EVALUATION OF NUSCHOLAR SCANSION TOOL ..... 72**
5.1 Research Objectives ..... 72
5.2 Study Design ..... 73
5.2.1 Study Population and Recruitment Procedures ..... 73
5.2.2 Participants ..... 73
5.2.3 Study Protocol ..... 74
5.2.4 Data Collection ..... 75
5.3 Results ..... 75
5.3.1 Background Questions ..... 75
5.3.2 User Satisfaction Ratings ..... 76
5.3.2.1 Overall reactions to the system ..... 76
5.3.2.2 Screen ..... 79
5.3.2.3 Terminology and System Information ..... 82

5.3.2.4 Learning ..... 86
5.3.2.5 System Capabilities ..... 90
5.4 Discussion ..... 93
5.4.1 Feedback about the system's features ..... 93
5.4.1.1 Overall reaction: ..... 93
5.4.1.2 Layout ..... 94
5.4.1.3 Scansion Marks Provided by the System ..... 95
5.4.1.4 Dictionary Feature ..... 95
5.4.1.5 Terms used ..... 96
5.4.1.6 Getting reviews ..... 96
5.4.1.7 Meter Evaluation ..... 97
5.4.1.8 Importing New Poems ..... 97
5.4.1.9 Print ..... 98
5.4.1.10 A Touch Screen Tablet Application ..... 98
5.4.1.11 Features Not liked ..... 98
5.4.2 Other functionality Needed ..... 99
5.4.2.1 Incomplete Feet ..... 99
5.4.2.2 Annotation ..... 99
5.4.2.3 The Way Some Standard Words are Scanned ..... 100
5.4.2.4 Oral Component ..... 101
5.4.2.5 Visualization of Meter ..... 101
5.4.2.6 Introductory Lecture ..... 102
5.4.2.7 Chat ..... 102
5.4.2.8 Linking with Existing E-learning Software's ..... 103
5.4.2.9 Miscellaneous ..... 103
5.4.3 Other Suggestions ..... 104
5.5 Revisiting Research Questions ..... 107
5.5.1 Research Objective 1: To determine if the system performs the scansion task in the way the stakeholders (teachers) want. ..... 107

5.5.1.1 Choice of Scansion Marks ..... 107
5.5.1.2 Flexibility in choosing the syllable ..... 108
5.4.1.3 Steps involved in scansion ..... 108
5.5.2 Objective 2: To determine if the system is easy to learn and easy to use. ..... 109
5.5.3 Objective 3: To determine to what extent the additional features provided by the system are useful. ..... 109
5.5.4 Objective 4: To gather qualitative feedback towards the system to understand what features are liked and what features need to be improved. ..... 110
5.5 Limitations of the Study ..... 111
5.6 Summary ..... 111
**CHAPTER 6 FUTURE WORK AND CONCLUSION ..... 113**
6.1 Future Work ..... 113
6.1.1 Scansion Features ..... 113
6.1.2 User Training Engine ..... 117
6.1.3 Interface for Professors ..... 118
6.1.4 Annotation Feature ..... 118
6.1.5 Oral Component ..... 118
6.1.6 Chat/forum functionality ..... 119
6.1.7 Collaboration with Existing E-learning Tools ..... 119
6.1.8 Automatic Scansion ..... 120
6.1.9 Links to Online Repositories ..... 120
6.1.10 Visualization of Meter ..... 120
6.1.11 Application for Touch Screen Laptops or Tablets ..... 120
6.1.12 Browser support ..... 121
6.2 Contributions ..... 121
**REFERENCES ..... 123**

**APPENDIX A: RESEARCH ETHICS BOARD APPROVAL LETTER- REQUIREMENT GATHERING STUDY ..... 131**

**APPENDIX B: SEMI-STRUCTURED INTERVIEW QUESTIONS- REQUIREMENT GATHERING STUDY ..... 132**

**APPENDIX C: RESEARCH ETHICS BOARD APPROVAL LETTER- FIELD EVALUATION STUDY ..... 134**

**APPENDIX D: RESEARCH ETHICS BOARD AMMENDMENT APPROVAL LETTER- FIELD EVALUATION STUDY ..... 135**

**APPENDIX E: QUESTIONNAIRE – FIELD EVALUATION STUDY..... 136**

# LIST OF TABLES

Table 3.1 Design Requirements for Scansion Tool ..... 42
Table 5.1 Summary of Comments about the Features ..... 104
Table 5.2 Summary of Suggestions ..... 106

# LIST OF FIGURES

Figure 4.1 Pop-up menu appears on selecting word. ..... 45
Figure 4.2 Scanning a monosyllabic word..... 46
Figure 4.3 Scanning a bi-syllabic word ..... 47
Figure 4.4 Scanning a polysyllabic word..... 47
Figure 4.5 Dividing a line into feet after the syllables have been marked..... 48
Figure 4.6 Dividing a line into feet and simultaneously marking the syllables..... 50
Figure 4.7 Using the undo feature..... 51
Figure 4.8 Different cases for using undo..... 52
Figure 4.9 Finding meter in the line..... 54
Figure 4.10 Getting reviews on scansion..... 56
Figure 4.11 Selecting a poem to scan ..... 58
Figure 4.12 Saving a poem ..... 59
Figure 4.13 Printing a poem..... 60
Figure 4.14 AutoSaved Poems..... 61
Figure 4.15 Using the Dictionary feature ..... 62
Figure 4.16 Glossary..... 63
Figure 4.17 The use of ruby tags ..... 64
Figure 4.18 Representation of ruby base and ruby text in HTML..... 65
Figure 4.19 State Transition Diagram representing the different states of a line in poem..... 70
Figure 5.1 How often do you scan poems?..... 76
Figure 5.2 How long have you worked on the system?..... 76
Figure 5.3 Overall Reactions to the system: 1=Terrible, 7=Wonderful ..... 77
Figure 5.4 Overall Reactions to the system: 1= Frustrating, 7= Satisfying..... 77
Figure 5.5 Overall Reactions to the system: 1= Dull, 7= Stimulating..... 78
Figure 5.6 Overall Reactions to the system: 1= Difficult, 7= Easy ..... 78
Figure 5.7 Overall Reactions to the system: 1= Rigid, 7= Flexible..... 79
Figure 5.8 Characters on the computer screen: 1= Hard to read, 7= Easy to read ..... 80
Figure 5.9 Was the highlighting on the screen helpful: 1= Not at all, 7=Very much..... 80

Figure 5.10 Were the screen layouts helpful: 1= Never, 7= Always ..... 81
Figure 5.11 Amount of information that can be displayed on screen: 1=Inadequate, 7= Adequate ..... 81
Figure 5.12 Arrangement of information on screen: 1= Illogical, 7= Logical ..... 82
Figure 5.13 Sequence of screens: 1=Confusing, 7=Clear ..... 82
Figure 5.14 Use of terms throughout the system: 1= Inconsistent, 7= Consistent ..... 83
Figure 5.15 Does the system terminology relate well to the work you are doing ..... 84
Figure 5.16 Messages which appear on the screen: 1= Inconsistent, 7= Consistent ..... 84
Figure 5.17 Messages which appear on the screen ..... 85
Figure 5.18 Does the system keep you informed about what it is doing? ..... 85
Figure 5.19 Error messages: 1= Unhelpful, 7= Helpful ..... 86
Figure 5.20 Learning to operate the system: 1=Difficult, 7=Easy ..... 87
Figure 5.21 Exploration of the features by trial and error ..... 87
Figure 5.22 Can the tasks be performed in a straightforward manner? ..... 88
Figure 5.23 Number of steps per task: 1= Too many, 7= just right ..... 88
Figure 5.24 Steps to complete a task follow a logical sequence ..... 89
Figure 5.25 Help messages on the screen: 1= Confusing, 7= Clear ..... 89
Figure 5.26 Tutorials for beginners: 1= Confusing, 7= Clear ..... 90
Figure 5.27 System speed: 1= Too slow, 7= Fast enough ..... 90
Figure 5.28 Response time for most operations: 1= Too slow, 7= Fast enough ..... 91
Figure 5.29 Rate of information display: 1= Too slow, 7= Fast enough ..... 91
Figure 5.30 How reliable is the system: 1= Unreliable, 7= Reliable ..... 92
Figure 5.31 System failures occur: 1= Frequently, 7= Seldom ..... 92
Figure 5.32 Correcting your mistakes/Ability to undo: 1= Difficult, 7= Easy ..... 93

# ABSTRACT

Scansion is the process of identifying the rhythm of a poem, which plays an important part in the process of analysing a poem by assisting readers in understanding its textual and contextual meaning. Usually, poetry students are taught to practice scansion on paper. In a time when digital media is assisting students through interactive learning in many fields, scansion is not much benefitted from it. Through this thesis we tried to provide a computer-based solution where users could practice scansion, with the added benefits of a digital medium. We conducted semi-structured interviews with the stakeholders of the project to gather the functional and design requirements for the system under consideration. Based on these requirements, we implemented an online scansion tool. We undertook an evaluation of the application to learn whether the system supports the scansion practice task in the way it is supposed to, if the additional features are beneficial in the learning process and which features needed improvement, along with an evaluation of the overall project. The results suggest that, although some features needed improvements, the users liked the application and expressed their interest in using it for practice.

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# CHAPTER 1 INTRODUCTION

This thesis describes the development and evaluation of a computerised tool for helping undergraduate students of English literature learn the poetry reading technique of scansion. Simply put, scansion is the process of determining the rhythm of a poem. Not all poetry — free verse for example — relies on rhythm; this thesis is concerned only with the subset of poetry for which rhyme is integral.

*Poetry* is an art which expresses ideas and emotions in an intense and impressive way. The distinctive attribute which makes a poem attractive is its motion and fluidity: the motion of meaning and emotion along with the motion of sound. The continuous motion that pushes the language forward is called *rhythm*. It is the rhythm that forms the heart of the poetic experience while understanding and enjoying poetry and is felt as much as it is heard or seen (Attridge, 1995).

The rhythm of the English language is basically a matter of syllables and stress. It is these two elements working together that provide the language with the rhythm it needs to keep going (Attridge, 1995). Syllables spoken with a natural stress are called *accented* or simply *stressed* syllables and the syllables spoken without a stress are known as *unaccented* or *unstressed* syllables. The regular pattern of these stressed and unstressed syllables form a *rhythm*. The basic patterns of these stressed and unstressed syllables are called *feet*. The number and type of feet in a line of poetry gives the *meter* in that line.

For example, if a line has 10 syllables with unstressed syllables at the odd positions and stressed at even positions, we can divide the line into 5 groups with each group having the repetitive pattern of unstressed syllable followed by a stressed syllable. Such a line is

called *iambic pentameter*: The term *iamb* refers to the specific pattern of unstressed-stressed syllable, while the term *pentameter* refers to a line having 5 units of the pattern. The six basic types of foot patterns in English poetry along with the terms for the number of feet in the line are discussed in detail in Chapter 2.

Rhythm is an important part in the process of understanding a poem. Besides providing the auditor with a delightfully engaging experience, the identification of rhythm and its variations helps in understanding the contextual meaning rather than just the textual meaning of the poem (Cobb, 2006). The process of identifying the syllables as stressed and unstressed and grouping them into well-defined patterns to determine the meter of a poetic line is called *scansion*. To scan a poem, unique symbols are used for each stressed and unstressed syllable, marked above the respective syllable. To group them into a recognised pattern another symbol (usually a / ) is used. The identified meter is then written beside the line.

Despite of the inconveniences associated with doing scansion on paper, it is still the predominant medium. This could primarily be due to the fact that the students are conditioned to scan poems on paper. As a consequence, they are devoid of the benefits that a digital medium can offer in the entire process of learning and doing scansion– therefore appreciating poetry. Someone might suggest using a drawing tool on the digital image of the poem as a solution to the scansion on paper. But it does not resolve the problem completely. A drawing tool will create free hand drawing symbols only as a layer of annotation but will not suggest any association between the syllables and the corresponding scansion marks. If there is no relation between the syllable and the

scansion mark, it will be difficult to digitally interpret and manipulate the meter in the line, hence suggesting the need of a better digital scansion tool.

## 1.1 Benefits of Digital Scansion Tool

The use of paper for scanning a poem or for any reading activity makes it a suitable choice due to many benefits that paper offers. First of all, it is very easy to read from paper since it is high contrast and does not put any strain while reading. Paper is also very light-weight so it is very to carry them a few of them around in addition to the tangible manipulations it can offer (Marshall, 2005; Marshall & Bly, 2005). While reading from paper, there are very few constraints regarding when, where, or for how long the reading activity could take place. Most importantly, writing on the paper is very fast and fluid which makes it the most suitable for any annotation task including scansion. Contrary to the expensive digital media, paper is very economical (Adler, Gujar, Harrison, O'Hara, & Sellen, 1998; K. O'Hara & Sellen, 1997; K. P. O'HARA, Taylor, Newman, & Sellen, 2002).

Although the use of paper for scholastic purposes has many advantages, it also has a few basic limitations which includes *symbolic*, cost and *interactional* limitations. Paper is often thought of as a symbol of an old-fashioned mentality and failure to progress to the modern era. The second major issue concerning the use of paper is the time and effort involved. Lastly, the use of paper restricts the users in the way they can interact including confined local use and limited capability to edit and reuse (Sellen & Harper, 2002).

We expect that a digital scansion tool, particularly an online application, could help students by eliminating basic problems with paper while also providing a thorough learning environment and experience in the following ways:

a) An online application will allow the users to practice scansion, access and use their work from anywhere as opposed to practising scansion on paper where they have to carry a paper copy(s) with them. By using the huge availability of online storage, the application will provide the users with online access of their data on the system through any machine with internet access.

b) A major advantage of an online application would be the help in achieving learning goals by easily sharing documents. Using this system users will be able to share their scanned poems, actively exchange ideas and engage in educational discussions with other users. This collaborative learning will not only increase interest for the task but also promote critical thinking (Gokhale, 1995). On the other hand, using only paper in collaborative learning would require multiple copies of the document to be created.

c) If the scansion is performed on paper, some extra line spaces are needed to be introduced between the lines of the poem before scanning it so that the work is readable after scanning the poem (Tucker, 2011). A digital tool would not require this extra effort since the scansion marks would automatically be adjusted within the poem lines.

d) A user scanning a poem would benefit from additional features, e.g., easy-to-access dictionary for the meaning and syllabic description of a word to accurately scan the poem. Furthermore, if an annotation feature is included with the tool, it would be

convenient for the user to put additional comments to help perceive poem better without blocking the poem text. All these additional features could be made available in a single application without requiring the user to gather dictionaries and papers for extra notes and all the notes would be stored with the poem.

e) A digital scansion tool would provide the users with a way to store their completely scanned poems for future reference or partially saved poems to be completed later. Digital copies of the poems would make it easy to store, retrieve and modify them.

f) A digital scansion tool will also reduce the amount of paper required for the scanning and making copies of the poems.

All these benefits make it desirable that the digital scansion tool be provided to the users for scanning poems.

## 1.2 MOTIVATION

The motivation behind this thesis is the unavailability of a digital scansion tool that would allow the poetry teachers to teach, and poetry students to learn and practice the scansion process on any poem either from the system's database of poems or some other poem of their choice. The system would overcome the limitations of paper, as described in Section 1.1, with the added benefits of digital medium. The system should allow the users to perform scansion in the way they interpret the poem through their choice of syllables (either in number of syllables or the type of stress on these syllables), as discussed briefly in Section 1.4.2 and elaborately in Chapter 2. Therefore, our research required a formal requirement gathering for such a system that could be beneficial to its users and then the evaluation of the system developed on the basis of requirements to understand how well the system performs for the prospective users.

## 1.3 Thesis Contribution

This thesis contributes in three areas:

1. Requirement gathering for the digital poem scansion tool through literature survey and interviews with the experts.
2. Design and implementation of Web-based application for poetry scansion.
3. In situ evaluation to assess the functionality and usability of the tool and acquire feedback from the prospective users.

## 1.4 Solution Overview

This section outlines the how this thesis addresses the contributions outlined above.

### 1.4.1 Requirement Gathering

An extensive literature survey was conducted to get the basic understanding of scansion, why is it done and how is it done. This literature survey led to the formation of the primitive idea of how the application would work. Since the project is developed for stakeholders at Nipissing University, it was mandatory to know what they would expect from the system. For this, interviews were conducted with expert stakeholders to procure the basic requirements for scanning the poem and additional functionality that could be included to enrich the learning experience. The most important requirement was that the user should have the freedom to choose the syllable from the word and mark it as stressed or unstressed rather than providing them with a poem having pre-divided syllables.

### 1.4.2 Design and Implementation

Although there is one digital tool available to practice scansion, it presents the poem with pre-divided syllables which is not a desirable feature as different users might have different interpretation of a line of poem which would affect division of some words into different number of syllables based on their preference. Moreover, the system has other limitations as well which are discussed in detail in Section 2.4. Since the scansion tool we propose is the first-of-its-kind, based upon its ability to allow the users to dynamically break the words into syllables, it was made from ground-up and many challenges were faced during the course of its development.

When the syllables are marked with a scansion mark, it usually appears on the top of the syllable. To display the syllable and the mark in the browser as two related entities, ruby tags (`<ruby>`) were used. The ruby base (`<rb>`) tag was used for syllables and ruby text (`<rt>`) tag was used for scansion marks (Sawicki, Suignard, Ishikawa, Durst, & Texin, 2008)

The basic requirement from the application was that it should allow the users to select the syllable by their choice. For some words, the number of syllables into which they can be broken depends on the user's preference. Consider the words "fire" and "steel" in the following line.

There was a fire in the steel mill.

Both these words can be considered as one syllable or two syllables depending upon the how the line works with the rest of the lines (Wilson, 2010). Moreover, scanning the poetry lines in a way that a foot differs from the other feet in the line could imply more

focus on the part where the meter changes. We wanted give freedom to the users to scan and interpret the lines in the way they consider them to be.

For this reason the system required that dynamic changes made in the ruby tags be managed and updated dynamically.

The poems scanned by the user are stored on the server which gives freedom to access them from anywhere without carrying the paper versions. The detailed design and implementation of the project is described in Chapter 3.

### 1.4.3 In situ Evaluation

Scansion begins with the user reading the poem aloud several times to get the accurate idea of the stressed and unstressed patterns. It seemed likely that users would not be comfortable enough to do so in a lab setting. Hence, a field study was chosen for the system's evaluation.

Also, users might have a preference for the type of poetry they read and scan. In such situations, providing the users with a certain set of poems to scan which they might not be familiar or comfortable with, will not justify the scansion task.

For the purpose of evaluation of the application, a field study was conducted with poetry teachers. The study was conducted in three sessions: Introductory, Practice and Post-practice sessions. In the Introductory session, the users were made familiar with the system and how it works. During the Practice session, the participants were asked to use the system for 2-3 days and perform the scansion as they would normally do. In Post-

practice session the feedback from the users was taken through questionnaire and discussion.

From the results of the evaluation, it can be concluded that the system performs scansion task in the way it is expected and the features provided in the system were appreciated. There were some functions which required simplified operation and some new ideas were also given by the participants which would greatly enhance the functionality of the application.

## 1.5 THESIS ROADMAP

This thesis is divided into 6 chapters. This chapter focussed on the introduction to rhythmic elements of poetry and the motivation behind the thesis.

Chapter 2 gives a detailed background on the various concepts of the poetry necessary to be known for the understanding of the system including the rhythm, meter, foot and scansion in the poetry. It also describes the tool currently available for practising scansion, in addition to the necessary background on e-learning and annotation applications.

In chapter 3, we will discuss about the process of requirement gathering thorough semi structured interviews followed by the results from the interview sessions.

The first part of chapter 4 focusses on the design of the application including the various features of the application. The second part discusses the algorithms designed for the various background operations in the application.

Chapter 5 discusses the methodology involved with evaluating the system and elaborates on the study participants, how they were chosen, the study details and the research questions behind conducting the study which is followed by the results from the study. It begins with the presentation of the results from user satisfaction ratings and detailed description of the participant's feedback followed by the assessment of the research questions.

The thesis concludes with chapter 6, concentrating on the future work possible on the basis of the results from the evaluation of the application and the conclusion of the entire work.

# CHAPTER 2 BACKGROUND AND RELATED WORK

In this chapter we focus on the related work in the field of e-learning, annotation and background knowledge on scansion. The researcher was approached by the stakeholders from Nipissing University who required an interactive e-learning system that could allow the users (poetry teachers and students) to scan the poems in a flexible way. Since the online scansion tool is an e-learning application, we reviewed some prior work done in the area of e-learning to understand the guidelines recommended for e-learning applications in Section 2.1.

Subsequently, scansion is a special type of annotation task done on poems, we also reviewed some work done in the field of annotations to understand the guidelines that could be followed while developing the online scansion tool in Section 2.2.

## 2.1 E-LEARNING

E-learning is one of the fastest growing areas of education and training in both academics and industry (Gilbert, Morton, & Rowley, 2007). The concept of e-learning can be defined as "the use of internet technologies to create and deliver a rich learning environment that includes a board array of which is to enhance individual and organizational performance" (Rosenberg, 2001) . E-learning has the potential to: improve the quality of learning; improve access to education and training; reduce the cost of education; and, improve the cost-effectiveness of education (Alexander, 2001). Research also suggests that students like to use e-learning if it facilitates their learning and allows them to learn any time anywhere in their own way (Papp, 2000).

A body of research has identified the Critical Success Factors (CSF) of e-learning. The term CSF reflects the important "things that must be done if a company is to be successful" (Freund, 1988). Papp (2000) suggested some CSFs which included intellectual property, suitability of the course for e-learning, environment building the e-learning course, e-learning course content, e-learning course management, e-learning platform and measuring the success of e-learning course. Benigno & Trentin (2000) considered some factors for the evaluation of e-learning course which includes student characteristics, student – student interaction, effective support, learning material, learning environment and information technology. On the similar lines, many researchers have worked to identify the CSF's for providing the effective e-learning environment (Baylor & Ritchie, 2002; Dillon & Gunawardena, 1995; Govindasamy, 2001; Helmi, 2001; Leidner & Jarvenpaa, 1993; Selim, 2007; Volery & Lord, 2000).

The US Department of Education have analysed and published the results from the meta-analysis of over a thousand empirical studies, which indicated the differences between online and face-to-face learning (Aparicio & Bacao, 2013). Some of these results include:

- Online Students performed better than those on face-to-face instruction. Blended Instruction (online and face to face) has more benefits over purely offline and online per se (Zhao, Lei, Yan, Lai, & Tan, 2005).
- On-line learning was found to be more beneficial to some types of students, such as undergraduates, graduates and professional students (Cavanaugh, 2001).
- Collaboration in online learning had positive impacts on learners that worked independently and the effectiveness of online learning varies among different learner types (Cavus & Ibrahim, 2007).

- There are some findings which show that the way students use media is far more important to their results, than having access to different media (Sitzmann, Kraiger, Stewart, & Wisher, 2006).

Researchers (Ardito et al., 2006; Costabile, De Marsico, Lanzilotti, Plantamura, & Roselli, 2005; Reeves et al., 2002; Storey, Phillips, Maczewski, & Wang, 2002) have presented some heuristics for the design and evaluation of the e-learning systems. Some examples of these heuristics (Reeves et al., 2002) are given below:

- The e-learning program's interface employs words, phrases and concepts familiar to the learner or appropriate to the content, as opposed to system-oriented terms.
- When appropriate to the content and target audience, the e-learning program adheres to general software conventions and is consistent in its use of different words, situations, or actions.
- The e-learning program makes objects, actions, and options visible so that the user does not have to remember information when navigating from one part of the program to another.

In addition to these guidelines, some other guidelines mentioned by (Reeves et al., 2002) which are followed in our application design and are briefly mention in the section 2.1.2.

### 2.1.2 Guidelines Considered for NUScholar

From the literature review of the e-learning applications, we understood what general guidelines could be followed for an effective e-leaning tool. The guidelines taken into consideration for the development of NUScholar are discussed below and heavily follow

from Reeves et al., (Reeves et al., 2002) . These guidelines could be followed by any other e-learning application as well.

- The terminology is related to the task (of scansion) throughout the system.
- The font choices are appropriate to the task.
- The white space is utilized suitably on the screen.
- Help and documentation is provided in the application and is readily accessible and clearly written.
- Appropriate means of error recovery are provided in application.
- The application should keep the users informed through sufficient feedback.
- The feedback messages should be clear and consistent.
- The e-learning application should provide some means of self-assessment.
- The interactions with the applications are suitable to the task.
- The e-learning application should provide sufficient learning resources.

## 2.2 ANNOTATION

Annotations occur in the form of highlighting, underlining, comments, notes, etc. on the source text which are used by readers to improve recall of emphasised items and influence the perception of specific arguments in the source material (Wolfe, 2000). Similarly, scansion can also be considered as a special kind of annotation task where scansion marks are put over the syllables in the source text (poem) to identify the rhythm in the poem. Therefore, we surveyed the literature related to annotations which is discussed in the text that follows.

Few studies (Blustein, Rowe, & Graff, 2011; Marshall, 1997; Renear, DeRose, Mylonas, & van Dam, ) explored what are the different types of annotations and what are the purposes of these annotations. They suggested that annotations can be categorised as telegraphic or explicit. *Telegraphic* annotations are the non-textual based annotations such as highlighting, underlining, symbols (asterisk, brackets, arrows, etc.). *Explicit* annotations are textual notes written in margin or in-between the text. They also identified the purpose of these annotations which includes marking important or unimportant text, provide the explanation of text, and marking the portion of text that require further attention in subsequent readings. Based on this research, we can identify the scansion marks as telegraphic annotation which has a well-defined meaning i.e. representing the syllables as stressed or unstressed.

Some studies (Lee & Chen, ; Marshall, 1997; K. O'Hara & Sellen, 1997) have explored the differences between the screen reading and reading from paper. They argued that the annotation task is integrated smoothly with the reading task on paper which is nearly effortless process while it requires to perform number of steps to create annotations on electronic devices. Considering this as a guideline, we aimed to reduce the steps for performing scansion on our digital tool.

Many digital tools have been developed to facilitate the annotation activity on an e-document. Xlibris (Schilit, Golovchinsky, & Price, 1998) is an example of such an annotation application which was developed to offer a paper-like interface. In this system, the user could draw freeform digital ink annotations using a pen tablet display. It might have provided a paper-like experience but had two limitations. Firstly, the annotations were merely a layer of drawing above the text, therefore the annotations

could not be associated with the text on which they were drawn. For example, if a text is highlighted, the system would not associate the text with highlight but will create a layer of highlight annotation where user has drawn with the pen. Secondly, the movement of the pen may result in irregular and sloppier annotations since touch screens are less sensitive and more slippery than paper (Agrawala & Shilman, 2005).To address this issue, another set of digital annotation software have been developed which provided different annotation tools in a toolbar menu such as highlighter, underline etc. unlike XLibris which only provided free hand drawing tool for annotations. An example of this annotation software is Adobe Reader[1]. Unlike freeform annotations, Adobe Reader links the text with highlight annotation. Considering, the fact that scansion marks need to be associated with their respective syllables to interpret the rhythm we chose to follow the similar approach of providing the scansion marks, which can be associated with a syllable, in a toolbar menu.

From the literature review of annotation applications, we considered the following guidelines that could be followed for the design of our scansion application.

- The process of scansion (annotating the syllables) should be effortless and include less number of steps.
- Provide toolbar based interaction technique for scansion since freeform ink based interactions would not form a link between the scansion symbols and syllables (annotation and text).

[1] http://www.adobe.com/ca/products/reader.html

## 2.3 SCANSION

English poet and playwright Christopher Fry once said, "Poetry is the language in which man explores his own amazement. It is the language in which he says heaven and earth in one word" (Hinchcliffe, 1977). As important as it is for poets to be able to express themselves, it is also important for the readers to appreciate the context and emotions of the poem which emerges as a function of its literary meaning. There are different poetic devices that contribute to making meaning in poetry. These devices include simile, alliteration, metaphor, personification. One in particular is rhythm. While speaking, we naturally put stress on some parts of the word, referred to as stressed or accented syllables, while some syllables are unstressed or unaccented. When spoken together, these stressed and unstressed syllables form a rhythm. An elaborate description of rhythm in language was expressed by Enid Hamer (Hamer, 1930):

> *When words are spoken in groups, the ear is conscious of movements or fluctuations in one or more of the qualities of their syllables, and when any kind of pattern or design is perceptible in the movement, the language becomes rhythmic. The* ***rhythm*** *has an effect on the mind which may be distinct from the rational meaning of the words to our understanding.*

When a poem has regularity in the pattern of stressed and unstressed syllables, it is said to have a particular meter. "*Meter* is an organising principle which turns the general tendency towards regularity in a rhythm into a strictly-patterned regularity that can be counted and named" (Attridge, 1995). In simpler words, *the pattern of stressed and*

*unstressed syllables in a line of poem is called meter and each repeating unit is called a foot*. The number of feet and the predominant foot in the line gives the name of the meter in that line.

There are different systems of marking a syllable as stressed or unstressed and each uses different symbols which are normally marked over the syllables. Hamer and Steele both used ictus (/) and x notation to mark stressed and unstressed syllables respectively, while (Fussell, 1965/1979), (Turco, 1968/1986), and (Williams, 1986) all use the ictus for stressed syllables, and the classical breve ( ˘ ) for unstressed syllables. In this thesis, ictus and breve notation will be followed.

There are some standard feet which can be observed in English poetry. These basic feet are:

1. Iamb ( ˘ / ): An *iambic* foot is a bi-syllable foot in which the first syllable is unstressed and the second syllable is stressed. This is the most common foot, with around 90% of all metered English poetry is written in iambic meters (Murdock, ). For instance, the word “return” has first syllable “re” as unstressed and the second syllable “turn” as stressed when spoken naturally.
2. Trochee ( / ˘ ): A *trochaic* foot is opposite to the iamb with the first syllable unstressed and second syllable stressed. An example of a trochaic foot could be the word “clever” where the first syllable “clev” is stressed and second syllable “er” is unstressed.

3. Dactyl ( / ˘ ˘ ): *Dactylic* is a tri-syllable foot where the stress is on the first syllable and the following two are unstressed. E.g. in the word “horrible” the first syllable “hor” is stressed while the syllables “ri” and “ble” are unstressed.
4. Anapest ( ˘ ˘ / ): An *anapestic* foot is also tri-syllabic with the first two syllables as unstressed and the third syllable as stressed. The word “understand” could be taken as an example to understand the anapestic foot. The first two syllables “un” and “der” are unstressed while the third syllable “stand” is stressed.
5. Spondee ( / / ): A *spondaic* foot has two stressed syllables. Consider the word “football”. Both the syllables “foot” and “ball” are stressed.
6. Pyrrhic ( ˘ ˘ ): *Pyrrhic* is a bi-syllabic foot with both syllables as unstressed. The word “pyrrhic” itself tells the tale of this foot where both “pyr” and “rhic” are spoken as unstressed.

Once the syllables have been marked as stressed or unstressed, they are divided into feet using a slanted line (/) with each foot having one of the above mentioned feet. The second attribute of the meter describes how many feet are there. The following section describes the names given to the meter according to the number of feet present in the line:

1. One Foot: Monometer
2. Two Feet: Dimeter
3. Three Feet: Trimeter
4. Four feet: Tetrameter
5. Five feet: Pentameter
6. Six feet: Hexameter

7. Seven feet: Heptameter
8. Eight feet: Octameter

So, if a line in a poem has 5 feet and all the feet are iambs, the line is said to iambic pentameter. Similarly, a line having 4 iambic feet will be called an iambic tetrameter.

This entire process of marking the syllables as stressed or unstressed and finding the meter in the line is called *scansion*. It treats verse lines as rows of discrete syllables and it divides lines into feet without reference to the ways in which the syllables may be clustered into words. So there is a possibility that the foot division and the word division do not collide (Steele, 1999). The main purpose of scansion is to indicate clearly the basic rhythmic structure of a line or group of lines. Scansion can be made more or less detailed depending upon the purpose it is being used for (Attridge, 1995). The vast majority of poems that we come across are in meters of iambic (Steele, 1999) either pentameter or tetrameter. Three syllable feet do occur, but they are rare, and usually used for special effect: comedy or onomatopoeia. The following examples are intended to make the concept of meter clearer.

˘ / ˘ / ˘ / ˘ / ˘ /
And gnaw / the fro / zen tur/ nip to / the ground

(John Clare, "Sheep in Winter", 3)

The above line is an example (Steele, 1999) of iambic pentameter. There are also cases when a variant foot is introduced in the line which would otherwise have a single predominant foot. It is done primarily to "subtly emphasize the meaning of the poem" and make it more interesting (Koster, 2008). The most common substitution in iambic

verse is a trochee-for-iamb switch in the first foot of the line (Steele, 1999). Consider the following examples (Koster, 2008)

/ ˘ ˘ / ˘ / ˘ / ˘ /
Far from / the mad / ding crowd's / ign ob / le strife

(Thomas Gray, "Elegy Written in a Country Churchyard", 73)

The line has a trochaic substitution in the first foot to emphasize distance.

˘ / / ˘ ˘ / ˘ / ˘ /
My heart / aches and / a drow / sy numb / ness pains

(John Keats, "Ode to a Nightingale", 1)

Above is again an example of trochaic substitution. We can clearly observe it in in the second foot to emphasise the ache, the pain. We can also note a substitution in an otherwise iambic pentameter line below:

/ ˘ ˘ / ˘ ˘ ˘ / ˘ /
Shall I / com pare / thee to / a sum / mer's day?

(William Shakespeare, "Sonnet XVIII: Shall I Compare Thee to a Summer's Day?", 1)

A pyrrhic substitution in the third foot acts like a pause as the poet thinks of something amazing to compare the beloved to.

Usually when people scan a poem, a few common steps are followed. The first of these is to prepare the poem for scanning. Once a poem is chosen, multiple spaces are introduced between the lines to accommodate the scansion symbols that will be drawn while scanning the poem (Tucker, 2011). If a poem from electronic source is chosen, such preparation would require downloading the poem and editing with some word processor to introduce line spacing before taking a print out. However, if the poem is selected from

some other printed material, it first needs to be digitalized before any work could be on its line spacing, otherwise the mere photocopy would result in a messy looking scribbled text after scansion.

The next step in the scanning process involves reading the poem aloud. A conscious effort needs to be put here in order to determine which word or part of word has a natural stress and which has not. The corresponding symbols chosen to represent the stressed and unstressed syllables are put over the respective syllables. The foot symbol is then introduced between the syllables so that each foot has a recognized meter although there might be instances when an incomplete foot is present in the line introduced by the poem on purpose. The identified meter is written beside the line.

The next major step is getting the reviews on the scansion performed which takes time since the teacher has to mark the all scanned copies from the whole class. Herbert Tucker describes his early experiences about getting his scanned poems marked as "the lapse of a week between receiving an assignment and getting it back corrected, a long span by any pedagogical measure, can be aeonically long within the embattled field of undergraduate attention." (Tucker, 2011)

Inspired by his experiences, he thought of developing a computerized tool that could save all the overhead involved with getting the poems ready to be scanned and reducing the time involved in getting the feedback on the scanned poems. The idea developed into an interactive website called "For Better for Verse" (Tucker, ). We explored the features offered by this tool by first-hand experience, which is explained in the following section.

## 2.4 "For Better for Verse"

The features of this tools are described in the following subsections.

### 2.4.1 Scansion Task

The interface provides the users with the polysyllabic words already broken into syllables and they are highlighted when the user hovers over them. The highlight also occurs in the case of monosyllabic words. When the user moves the cursor just above the syllable, the space above the syllable glows. By clicking once on this glowing space, the user can mark the corresponding syllable as stressed, twice for marking it as unstressed, and thrice to clear the scansion mark. By clicking between the syllables, the user can divide the line into different feet.

### 2.4.2 Poems To Scan

The system provides a set of poems to choose from to practice scansion. A list of these poems appears in a panel at the right hand side of the webpage, which has been sorted according to the title, difficulty level, type, and the poet.

### 2.4.3 Meter Identification

To check if users have correctly identified the stress/unstressed syllables, they can click on the first button located at the end of the line. A green, red or yellow signal implies that the syllables have been scanned correctly, incorrectly or somehow problematically.

To check if users have correctly placed the feet, they can click on the second button located at the end of the line. A green or red signal implies that the syllables have been scanned correctly or incorrectly.

To check whether or not the user has identified the meter correctly, the user needs to click on the third icon located at the end of the line. On clicking, a pop-up window opens asking the user to select the meter and the number of feet in a line, from the drop-down menus. On clicking the submit button, the system tells whether the user has identified the meter correctly by showing a green checkmark, which is red otherwise.

### 2.4.4 Additional Features

For certain poems, the system gives suggestions describing the oddities or beauties of the line in question, which appear on clicking the bulb icon. In some cases, the description also include the different interpretations of line.

After marking the whole poem correctly, when the user check the Syncopation checkbox, it shows the rhythmic discrepancies in different color.

This system provides a feature to check if the user has correctly identified the rhyme scheme in the poem. On clicking the Rhyme button, the textbox in front of each line appears, where the user can type in the standard notation of rhyme.

The system also provides a checkbox which enables the user to see the caesuras or mid-line pauses within the poem.

The system provides Resources tab for certain poems which shows a short bibliography of scholarly critical treatments of the poem, or an audio version of the poem.

### 2.4.5 Glossary and Instructions

This provides a glossary that provides the description of some technical scansion related terminology. It also provides instructions for using the system and scanning a poem.

### 2.4.6 Limitations of "For Better For Verse"

Although the system provides many features but it has some limitations which are described below:

- The system presents the polysyllabic words already broken into syllables but it seems that if the syllables are already divided, the user would not try to do the scanning differently. For example, consider the word "widening" in the first line from W. B. Yeats's "The Second Coming".

  Turning and turning in the widening gyre

  Widening can be divided into 2 syllable as wide/ning or 3 syllables as wid/en/ing. If the two-syllabic version is chosen, the poem conforms to the meter and makes the line as ten syllables. The three syllabic version makes the word itself *wider*, which relates directly to its meaning, and in that way contributes to the atmosphere of the poem (Murdock, ). But such variations cannot be accommodated by the system since the syllables have already been divided for the user and there is no way this division can be overridden.

  Also, the pre-created syllables will not test the user's knowledge of dividing the words into syllables.

- This system does not provide the independence to the end-users (public users) to add their own poems for scanning however the poems might be added from the administrator's end. This system has some poems in its database on which user can perform the scansion but it does not allow the users to input a poem or import from an

external source e.g. a poem written by the users themselves as a part of homework or out of creative urges.

- The interface does not provide any dictionary lookup. A user might need a dictionary handy while scanning a poem to either look for a word for its phonetic description, its meaning or its pronunciation in order to correctly scan the poem.
- The interface does not have any provision to save the poems that have been scanned by the user or to store it anyhow for the future reference. It also does not provide any option to print the scanned poems if the user wishes to.

To the best of the researcher's knowledge, "For Better for Verse" is the only tool available for poetry teachers and students that allows them to scan the poems. But it lacks some features that might be required for the complete learning experience (See Table 3.1).

### 2.4.7 How "For Better for Verse" could be better integrated into the practice of teaching with computers?

In the sections 2.4.1 through 2.4.6, we presented the analyses of the features which the system offers and the potential limitations associated with the system. To understand what features are required from a digital scansion tool, we gathered the requirements through semi-structured interviews (Chapter 3). From the requirements collected, we observed that there are some features that the potential users need to perform scansion task but are not offered in "For Better for Verse". These requirements are elaborated in Sections 3.3.1 to 3.3.8 and summarized in Table 3.1 (page 41-42).

To better integrate this tool into teaching practice, we can take into consideration the results from previous research (Zhao et al., 2005) which found out that students perform better through blended instructions rather than purely face-to-face or online instructions. In addition to the classroom lectures, the teachers could assign scansion tasks to students depending upon the level of difficulty of scansion they want the students to work on. The students could learn about the technique of scansion, the terminology involved and other technicalities involved in scansion in the classroom and can practice the theoretical knowledge gained from the classroom by scanning poems using this application at the time most suitable to them. Additionally, students can be asked to perform as much scansion using the tool.

From the student's perspective, the tool would allow them to practice scansion at their own convenience and they could practice as much as they want irrespective of how fast they learn and master the technique.

From the teacher's point of view, incorporating the tool into the curriculum would allow them to interactively teach scansion to the students. It might also allow the teachers to equally focus on other areas of their course without having to spend the classroom time on scansion practice.

## 2.5 SUMMARY

From the literature review, we understood the guidelines that could be taken under consideration while developing an e-learning application (See section 2.2) since the scansion application is a type of e-learning application. We also reviewed some literature related to annotation to understand what guidelines could be followed for developing our

scansion tool since scansion is a special type of annotation (Section 2.2). Later in the research process, we undertook a literature survey to understand the scansion process including what type of scansion marks are typically used, how is the meter evaluated what variations could occur in a regular meter and what the variations imply (Section 2.3). We also analysed the tool currently available to practice scansion to understand what features it offers and features it does not offer which might be necessary (Section 2.4).

By the end of the literature review we had the basic information about the scansion task but since the application was developed for two particular groups of users – poetry teachers and poetry students, we wanted to know what features they expect the system to have. To understand this, we conducted semi-structured interviews with one of the user group which is discussed in Chapter 3 where we have describe the requirement gathering process for the system and what features were decided upon to be included in the new system to be developed.

# CHAPTER 3 REQUIREMENT GATHERING

From the literature review of scansion in poetry, we understood the basic process of scansion which includes how people scan the poems on paper, what notations they used for marking the syllables as stressed or unstressed and for what purposes they scan the poems. But we were interested in understanding what features the users (students and teachers of poetry) would want from a digital tool for performing scansion task. We also wanted to know what additional features they would like to be present in such a system which not are usually not available when they scan on paper. Therefore, we conducted semi-structured interviews with the stakeholders of the project.

This chapter focusses on the requirement gathering process for NUScholar poetry scansion system. The first part of the chapter gives the research objectives behind the study. The second part of the chapter focusses on the detailed study design followed by the results of the semi-structured interviews.

With the first meeting with the primary stakeholder, the researcher was instructed on the basics of scansion. This was followed by an intensive literature survey to learn the details on scansion such as what symbols are used, what variations occur in an otherwise regular meter as described in the previous chapter.

Although this information was enough to produce a basic scansion tool, we still required opinions from the actual users about their expectations from the application. For this reason, we conducted semi-structured interviews to know what additional features would be required from the NUScholar poetry scansion tool in addition to confirming the basic needs.

Since the application was to be developed to cater two user groups – students of poetry and teachers of poetry, it was obligatory to recognize their requirements from the system. To accommodate this need, interview sessions were conducted with the stakeholders of the project who are poetry teachers. The details of the entire information gathering process is explained in the sections below.

## 3.1 Research Objectives

The study was conducted with a few objectives in mind. Since the researcher's knowledge about the scansion was obtained entirely from personal research, it was necessary to confirm if building an application on the basis of that knowledge would be acceptable to the actual users of the application. Additionally, to understand the personal preferences of the stakeholders, it was necessary to communicate with them so that they could let the researcher know about their anticipation about the project. Lastly, it is possible that the researcher might not have thought of some aspects that could be essential in the application. Unearthing such features could be possible through discussion. Keeping all these objectives in mind, the interview sessions were conducted with the stakeholders who would eventually be using the application in teaching scansion. In a summary, the research objective behind the study was to gather the basic and additional user requirements for the design and development of tool to assist the students in scansion.

## 3.2 Study Design

This section will focus on the elaborate study design including the study population, detailed methodology, benefits from the study and data collection.

The study was conducted with 4 teachers of poetry from Nipissing University. These professors were the stakeholders of the project in the terms that they would be using the application in future for teaching scansion to their undergraduate students. Thus, the population of the study consisted of teachers of poetry.

The stakeholders or the participants, as they will be referred to as in the rest of the section, were recruited by the researcher through directly contacting them and asking them to take part in the study.

All participants involved in this study signed an informed consent form. The consent forms were sent to the participants by scanner and e-mail and received back through fax. The process of obtaining the consent was administered by the researcher before the start of the interview session. The informed consent forms outlined the risks and benefits associated with the study, a description of the study, the participant's right to withdraw without consequence, and assurances of confidentiality and anonymity of personal data.

The interviews were conducted over Skype[2] since the researcher was present at Dalhousie University and the participants were present at Nipissing University.

The participants were asked open-ended questions regarding the requirements from the scansion tool, which are listed in the Appendix B. The duration of the interview varied from participant to participant depending upon the time they took to communicate the requirements. The entire interview was audio recorded to support the accurate reporting of responses without disrupting the flow of the discussion but were not fully transcribed. Additionally, some notes were also taken from the interview sessions. Notes from the

[2] http://www.skype.com

sessions were taken on paper and a voice recorder was used for the audio recording of the entire session.

## 3.3 Results

The participants were asked qualitative questions in the interview sessions to gather the system requirements. The data collected in the form of audio recording and notes were then reviewed and are presented in the rest of the section.

### 3.3.1 Type of Application

All the participants unanimously stated that they would like the application to be developed as a Web-based application and no one preferred to be made it for a touch screen tablet since not many English students use tablets in classrooms and it would be a while before they will start to do so.

Considering the requirement, it was decided that the first version of the application would be designed only as a Web-based application.

### 3.3.2 Scansion Marks Required and their Availability

Three participants said that they use a slash "/" for stressed syllable while 1 participant said that he used an acute symbol. P1 used an upside down U ( ⏜ ) for unstressed, P2 used "x", while P3 and P4 used " ˘ " for the unstressed syllable. All of them used a forward slash (/) for division between feet. Since there was convergence on the symbol for unstressed syllables, " ˘ " was chosen. The majority of the participants used the same symbol for stressed syllable and division between feet and using same symbol for two

different purposes would cause confusion for the system, "/" was reserved for division between . For the stressed syllables " ¯ " was chosen.

For the purpose of development of this system, " ˘ " symbol was chosen for marking the unstressed syllables and " ¯ " symbol for marking the stressed syllable, but for the system to be used in real world, customization could be offered to the users so that they can choose the symbols of their own choice.

According to the participants, these symbols should be available to the users at the time of scansion and should be place on the screen in such a way that it should not obscure the poem while reading it. In order to accommodate this need, it was chosen that a pop-up toolbar would be provided to mark the poem which would not obscure the text of the poem and would be available whenever the user is scanning the poem.

### 3.3.3 Appearance of the Poem

The participants wanted the poem to appear on the screen in a way that the users are able to read the poem unobtrusively. P2 asked that the used should be able to see both marked and unmarked poems. P3 wanted indentation between different lines and stanzas wherever required.

Considering the requirements from the participants, it was decided all the versions of poem namely scanned, unscanned and partially scanned poems would be available for the users to see. The only the poem would appear in the workspace area.

### 3.3.4 Requirements for Saving the Poem

All of the participants required that the poems be saved. P2 stated that it would be useful to give the option to the user to save the poem by current date however P3 required that all the versions of the poems be saved even if a single line or a single syllable has been marked. In addition to that P3 raised a concern about the multiple copies that would be created at the end which might be difficult to manage. It was suggested by P3 that only the copies which are significantly different from the previous copies be saved. P4, however, required that all the copies of the poem be saved.

Considering all the requirements about saving the poem, it was decided that the control would be given to the users as to when they wish to save the poem. To manage multiple copies, an option to delete the unnecessary copies would also be provided to the users instead of depending on the computer to save significantly different copies since it might mean data loss to some users.

In addition to the option to save a poem, an autosave feature would also be provided in the application. The users would perform scansion task on their Web browsers thus the changes they make to the poem will only be reflected on their browsers i.e. client side. The client side changes are not saved to the server until users explicitly save it and are lost when the page is refreshed/reloaded or users navigate to some other page. For example, if a user is scanning a poem and accidently presses the refresh button or backspace on keyboard (which takes the user to the previous page he visited) without saving the progress on a poem, their scansions would not be saved and when they return back to the page, their progress would not be reflected. Thus, providing an autosave feature would save the users from worrying about such actions. This feature would create

recovered copies of a poem being scanned in case the user accidently navigated to another page.

### 3.3.5 Checking the Accuracy of Marked Poem

P1, P2 and P3 required that system should display if the poem has been marked correctly line by line as the poem is being scanned. P1 discussed that although some lines can be scanned in multiple ways, not all the possible variation are required at the undergraduate level and a subtle message be given to the user if his scanned version varies from the professor's version. P2 required that the feedback be given in a way wherein for the first few lines, the feedback be given for all the line and then decrease gradually. P3 suggested that the database could be designed to keep all the versions of variation in poems and if the user's marking matches with anyone of them, it is correct but does not imply that if they do not match, the user is incorrect. P4 wanted the option to be given to the user if the wanted to check the marking line by line or after they have scanned the poem.

To facilitate the requirements about checking the accuracy of the scanned poems, it was thought that an option to review the poems would be given in the system as the most basic option. Using this option the users could view their scanned version of the poem along with their professors marked versions to see the difference. The facility where the system would check the accuracy of each line of the poem as it is being marked by the user was left to be provided in the later versions.

### 3.3.6 Choosing a Poem to Scan

P1 and P3 could think of the system being used both in and out of the class, so the poems should be made available to users who are considering both scenarios. If it is used as a

supplement to classroom, poems could be assigned by the professor in the form of homework to the users. If it is used a learning tool independent of the class, the users should have some poems to choose from. P2 believed that a list of poems arranged alphabetically by title would be sufficient while P4 desired that the poems be assigned to the users.

On taking about the possibility where the users might wish to scan poems outside of the system's database, P3 raised a concern about the quality of the poem. But in the case where the imported poem would only be available to the user who imported the poem, P3 wanted an easy interface to copy and paste the poem from a reputable resource while P1 and P2 desired of an interface where they could import a PDF document. P2 and P4 suggested that a link to a reputable source could also be used as an option to import the poem at that location.

To accommodate the requirements suggested by the participants, it was decided that in the first version of the application, a set of poems would be provided for the users to practice on. They would also be provided with an option to import their own poem through copying and pasting or typing but these imported poems would only be available for that individual user. The facility to import poem as a PDF document and direct import from a repository was left to be incorporated in the future versions of the application.

### 3.3.7 Dictionary

All the participants wanted the dictionary to be made available to the users to be used while scanning. P4 suggested that the system could provide the functionality where the user could select the word and be directed to a dictionary resource.

Since all the participants unanimously wanted the dictionary feature to be present in the application, the feature was decided to be incorporated and was designed in a way similar to P4's suggestion.

### 3.3.8 Other Features Required

Some other features suggested by the participants are listed in the subsections below.

#### 3.3.8.1 Ability to Correct Mistakes

P1 required that the system should provide the option to the users to correct their mistakes. In case, when a user scans a word in a particular fashion but later on thinks that the word could be scanned in some other way, the system should provide the facility to change the scansion mark over a syllable, modify the way a word has been broken in syllables and change the way a line has been divided into feet.

#### 3.3.8.2 Audio Version of Poems

P1 also wanted the system to have links to audios of poems being recited in addition to some handwritten poems in the form of PDF documents which could add an interesting element to the system.

#### 3.3.8.3 Color Blocking the Stanzas

Regarding the structure of poems, P1 stated that there could be color blocks for differentiating in the stanzas of a poem.

*Stanza* is "a group of four or more lines whose metrical and rhyme scheme, established at the beginning of a poem, repeats as long as the poem lasts." (Steele, 1999). A group of 2 or 3 lines could either be considered as stanza or be called couplet or triplet respectively.

According to P1 color blocking these stanzas could make it distinguishably noticed. P1 gave an example of a sonnet to clarify the requirement. *Sonnet* is a fourteen line poem written in iambic pentameter and could either have 2 stanzas having eight and six lines each with a rhyme scheme of *abbaabba cdecde* or 3 stanzas having 4 lines each followed by a couplet of 2 lines with the rhyme scheme of *abab cdcd efef gg (Academy of American Poets, ; Steele, 1999)*. A different background color for each stanza might help the students to better identify the type of poem and thus the meter.

#### 3.3.8.4 Adding Notes and Comments

An interesting idea about the placement of comments or notes on the poems was given by P1, who desired that as in certain anatomical atlases in which the different human body systems were printed on transparent sheets and layered on top of one another to get a complete view, something similar could be done for scanned poems and the notes the user took: one in each layer. While P2 required that the words in the poem could be circled and their meaning or definition could be put besides them; this meaning could help the users decide, in some cases, the type of stress the word could carry.

#### 3.3.8.5 Highlight

P2 said that a highlight feature could also be included to highlight parts of the text as an annotation.

#### 3.3.8.6 Print

P2 enquired if the poems (scanned/unscanned) could be printed without losing the format of the scanned poem. This feature was decided to be incorporated in the applications since some users might have to take a print of the poems for various academic purposes

such giving handouts in class (in case of teachers) or submitting a poem as a part of an assignment (in case of students).

#### 3.3.8.7 System Asking Poem-Specific Questions

Adaptability was something P2 was interested in looking in the system. As P2 said, the professor might be interested in asking some questions related to a specific poem e.g. Is the poem a sonnet? Or is the poem a haiku? The system could unfold the features as the user has marked a couple of lines. If the user has marked 7 feet in a line, the system could ask if the line could be a haiku.

#### 3.3.8.8 Chat/ Discussion

Chat or discussion forum functionality was also requested by P2 to be made available to discuss the variations in the scansion marks the users could have.

#### 3.3.8.9 Concordance

P2 also suggested that a concordance feature could be incorporated into the system. Concordances list the words and phrases that appear in the work(s) of a poet along with the citation of the work(s) in which that word appears so that it is easier to locate a poem even if the user recalls a/some word(s) of the poem. It would also make it easier for the users to be able to see if a poet uses a phrase more often in his work and then scrutinize what could the significance of such repetition be.

#### 3.3.8.10 Caesura

P3 wanted to include a feature for the user to mark a mid-line pause, caesura, wherever applicable.

#### 3.3.8.11 Enjambment

Additionally, P3 wanted to see if the system could provide the feature to identify enjambment which is the continuation of a line over a line break.

#### 3.3.8.12 Automatic Meter and Feet Substitution Identification

P3 was interested in seeing if the system could automatically identify feet substitution and indicate to what degree the poem is regular. We decided to include this feature in our system as it might give a chance to the

#### 3.3.8.13 Grading and Marking for Teachers

P3 wanted that the system could provide a feature the professor can see, comment on and grade user's poems instead of being marked by the system

#### 3.3.8.14 Line Numbers for Poem Lines

P3 was curious to see if there could be line numbers in the poem for easy navigation so that the users would not have to scroll through the longer poems and navigate directly to a specific line.

#### 3.3.8.15 Audio for Different Accentual Syllabic Values

P4 wanted that the system could have audios behind the words different accentual syllabic values.

#### 3.3.8.16 Glossary

P4 also wanted the system to provide a glossary of the technical terms like iambic, pentameter, etc. We decided to incorporate this feature into our application since we

thought that providing all the basic definitions and concepts related to scansion might help the student user group.

Out of these miscellaneous features, some features were shortlisted to be included in the first iteration of the application and are mentioned in the table below along with other features that are to be implemented in the first version. The rest of the features are left to be included in the next iterations. The features which are incorporated in the first iteration are listed in the table below and are discussed in detail in the Design and implementation chapter.

| # | Requirements | Discussed Under Section | For Better For Verse | NUScholar |
|---|---|---|---|---|
| **1.** | Designed as a Web-based application. | 3.3.1 | ✓ | ✓ |
| **2.** | Flexibility in choosing the syllables | 1.3, 1.4.2 | × | ✓ |
| **3.** | Customization of scansion marks | 3.3.2 | × | × |
| **4.** | Automatic identification and display of meter | 3.3.8.12 | × | ✓ |
| **5.** | Automatic identification and display of feet substitution | 3.3.8.12 | × | ✓ |
| **6.** | Freedom to end-user choose a poem to scan | 3.3.6 | × | ✓ |
| **7.** | Checking the accuracy of scanned poems. | 3.3.5 | ✓ | ✓ |
| **8.** | Dictionary feature | 3.3.7 | × | ✓ |
| **9.** | Ability to import new poems for end-users | 3.3.6 | × | ✓ |
| **10.** | Save the poem (scanned/ partially scanned) | 3.3.4 | × | ✓ |

| # | Requirements | Discussed Under Section | For Better For Verse | NUScholar |
|---|---|---|---|---|
| **11.** | Create autosave versions for recovery | 3.3.4 | × | ✓ |
| **12.** | Facility to correct mistakes | 3.3.8.1 | ✓ | ✓ |
| **13.** | Audio versions of poems | 3.3.8.2 | ✓ (For some poems) | × |
| **14.** | Color Blocking Stanzas | 3.3.8.3 | × | × |
| **15.** | Adding Notes or Comments | 3.3.8.4 | × | × |
| **16.** | Highlighting tool | 3.3.8.5 | × | × |
| **17.** | Being able to print the scanned or unscanned poems. | 3.3.8.6 | × | ✓ |
| **18.** | System to ask poem-specific questions | 3.3.8.7 | × | × |
| **19.** | Chat/ Discussion Forum | 3.3.8.8 | × | × |
| **20.** | Concordance | 3.3.8.9 | × | × |
| **21.** | Caesura | 3.3.8.10 | ✓ (Automatically shown to users) | × |
| **22.** | Enjambment | 3.3.8.11 | × | × |
| **23.** | Grading and marking feature for teachers | 3.3.8.13 | × | × |
| **24.** | Line numbers | 3.3.8.14 | × | × |
| **25.** | Audio for Different Accentual Syllabic Values | 3.3.8.15 | × | × |
| **26.** | Glossary of technical terms | 3.3.8.16 | ✓ | ✓ |

**Table 3.1 Design Requirements for Scansion Tool**

## 3.4 Limitations of the Study

We have two distinct user groups (students of poetry and teachers of poetry) for this application. However, for the process of requirement gathering we only interviewed one

group i.e. teachers of poetry. To understand the design requirements from the student point of view, the study design should have also have considered interviewing the student user group.

## 3.5 What Could Have Been Done Differently?

We could have shown “For Better For Verse” application to the interviewees before the interview sessions. This might have given them some different ideas which they would not have thought of while answering the interview questions.

# CHAPTER 4 DESIGN AND IMPLEMENTATION

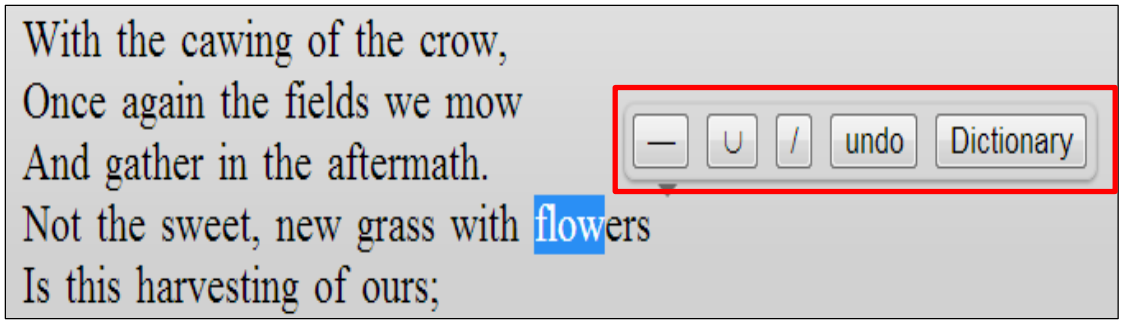
As described in the previous chapter, requirements, which were expected by one group of prospective users i.e. teachers of poetry from the NUScholar scansion tool, were gathered through semi-structured interviews. This chapter discusses what features were included and how they were incorporated in the application. The design part of the Chapter focusses on design of the application with all the features of the application explained from their usage point of view. In the implementation subsection, some algorithms have been discussed which were developed to implement some of the important features.

## 4.1 DESIGN

From the results of the interviews and the literature survey, a set of features was finalised by the researcher (in Table 3.1) to be included in the first iteration of the NUScholar poetry scansion tool. The design of these features is described individually in the sections below.

### 4.1.1 Scanning

Before starting to scan the poem, the user needs to know what scansions marks or stressed are used in the system. Usually in applications, in order to let the users see the available options, a toolbar is given on the top or left of the screen. In this application, we have provided a pop-up toolbar that appears over the top of the selected word/portion of word when the word is selected using the mouse. Figure 4.1 shows the pop-up toolbar. The toolbar disappears when one of the options is chosen or the user clicks somewhere else on the screen.




(Henry Wadsworth Longfellow , "Aftermath", 5-9 )

**Figure 4.1 Pop-up menu appears on selecting word.**

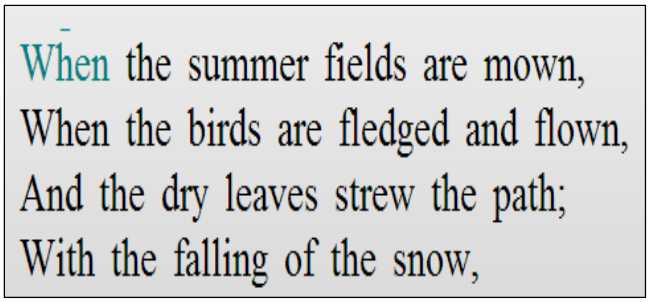
The reason behind choosing a pop-up menu lies in the Fitts' law (MacKenzie, 1992). Since the user needs to access the scansion marks most often than any other option, they should be provided to the users closer to where it is needed without adding the overhead of moving the cursor every time to a fixed menu bar. For this reason, a context menu is provided that appears just over the selected word. Instead of using a vertical context menu, a horizontal one was preferred by the researcher since a vertical menu would obscure more text. A pie menu could also have been used but they consume more screen space (Karafillis, 2012) which could also conceal the text.

The options in the pop-up toolbar are arranged in the order of their usage. Stressed and unstressed symbols are used more frequently than the foot symbol and undo, hence they are placed at the beginning of the toolbar and closer to the cursor position.

The first and the most important feature required from the scansion tool that would make it flexible was that it should allow the students to select the syllables by their choice and mark them as stressed and stressed. This means that the poems cannot be provided to the users with pre-divided syllables and the entire control has to be given to the user.

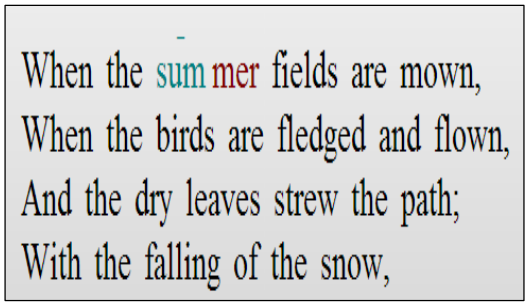
To allow such flexibility in terms of syllable selection, the tool provides the facility to the users to select any part of the word which they think is a syllable. The tool can handle every possible way in which the user may select the syllable. The marked syllables are shown in a color different from the color of the rest of the poem to increase readability and create distinction between unmarked and marked syllables. The different possible ways in which the user can choose a syllable are:

1. Monosyllabic Words: The user can select the entire word as a single syllable and mark it as stressed or unstressed. Figure 4.2 shows such a monosyllabic word marked as stressed highlighted in the color teal.
2. Polysyllabic Words: The syllables from a polysyllabic word can be selected in any order. The scanned syllables are highlighted in teal color whereas unselected syllable(s) from a polysyllabic word are highlighted in maroon color to maintain distinction between the syllables. Figure 4.3 (a) shows the first syllable of a bi-syllabic word selected and scanned first whereas Figure 4.3 (b) shows the second syllable of the bi-syllabic word selected and scanned first. While Figures 4.4(a) and (b) show the syllable scanning in different orders, Figure 4.4 (c) shows the scanning of other syllables after marking one of them.

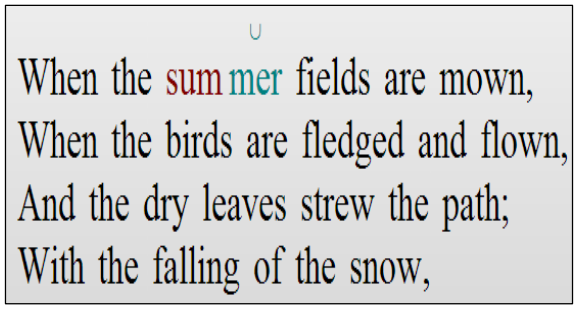



(Henry Wadsworth Longfellow , “Aftermath”, 1-4)

**Figure 4.2 Scanning a monosyllabic word**



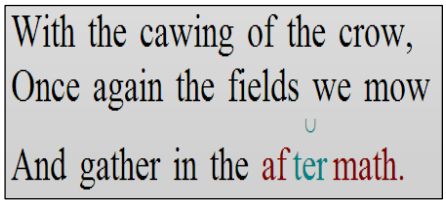

(a) First syllable of bi-syllabic word scanned first



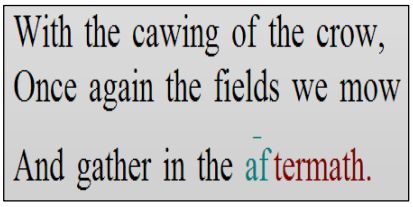

(b) Second syllable of bi-syllabic word scanned first

(Henry Wadsworth Longfellow , "Aftermath", 1-4)

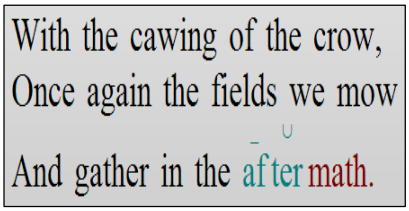
**Figure 4.3 Scanning a bi-syllabic word**




(a) Second syllable from tri-syllabic word scanned first




(b) First syllable of the same tri-syllabic word scanned first



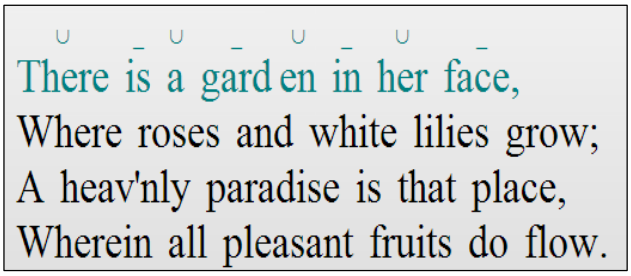

(c) Other syllables can also be scanned in any order

(Henry Wadsworth Longfellow , "Aftermath", 5-7)

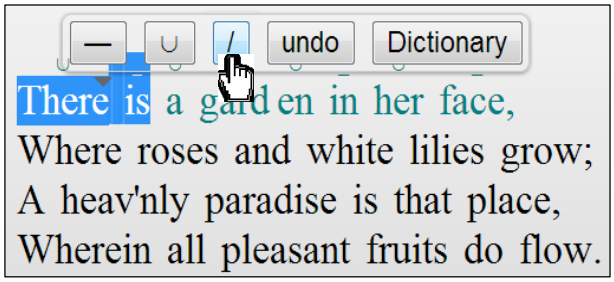
**Figure 4.4 Scanning a polysyllabic word**

To scan a line, the user starts marking the syllables as stressed or unstressed by selecting them using a mouse and choosing the applicable mark from the toolbar. The line can be divided into feet either after all the syllables have been marked or simultaneously marking the syllables and dividing them into foot. To divide the syllables into feet, the user selects all the syllables or words that they thinks will come under a foot and click "/"

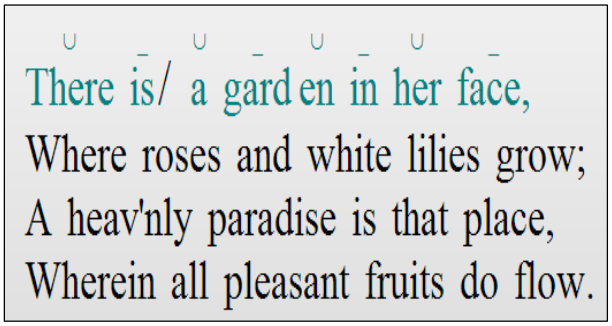
symbol on the toolbar. Figure 4.5 shows the division of a completely marked line into feet.



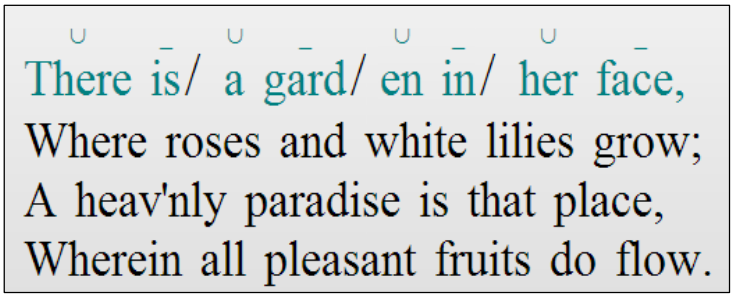

(a) Scan all the syllables in the line




(b) Select the syllables that come under one syllable and click "/" symbol on the pop-up toolbar




(c) Division of syllables into foot

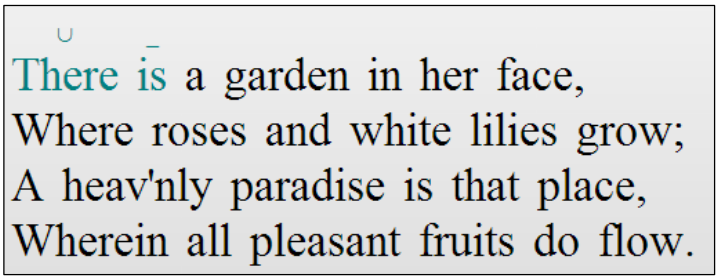



(d) Division of line into feet

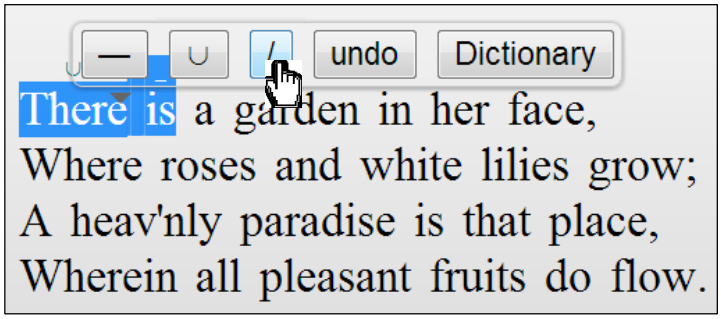
(Thomas Campion, "There is a Garden in Her face", 1-4)

**Figure 4.5 Dividing a line into feet after the syllables have been marked**

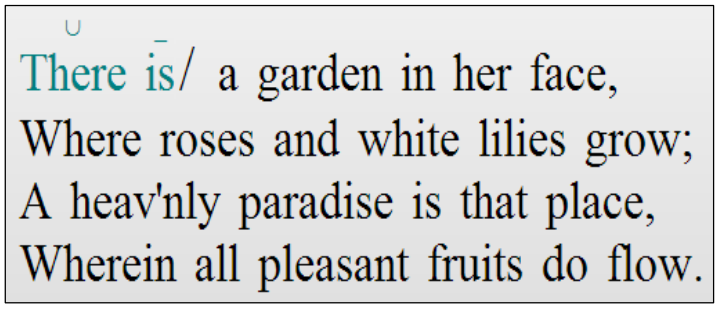
Figure 4.6 depicts how the user can divide the line into foot along with scanning the syllables. Figure 4.6(a) shows two syllables scanned by the user. The user can select the syllables the come under one foot and choose the "/" button. The scanned syllables will be separated from the unscanned syllables with a forward slash (Figure 4.6(c)).



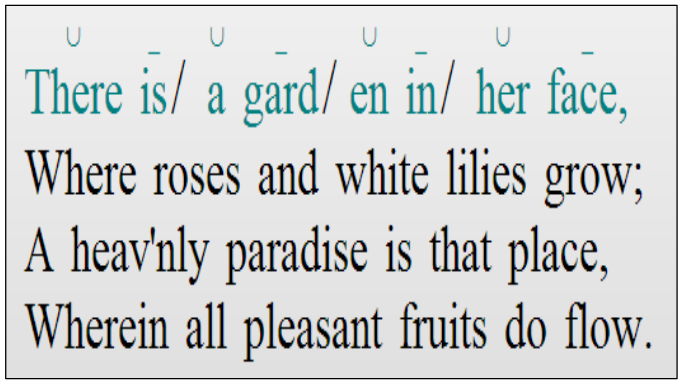

(a) Scan all the syllables in the line




(b) Select the syllables that come under one syllable and click "/" symbol on the pop-up toolbar




(c) Division of syllables into foot




(d) Division of line into feet

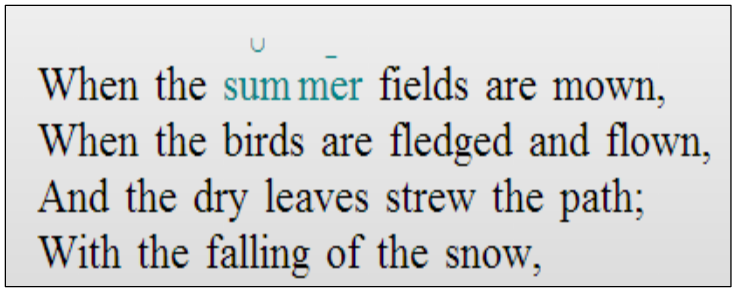
(Thomas Campion, "There is a Garden in Her face", 1-4)

**Figure 4.6 Dividing a line into feet and simultaneously marking the syllables**

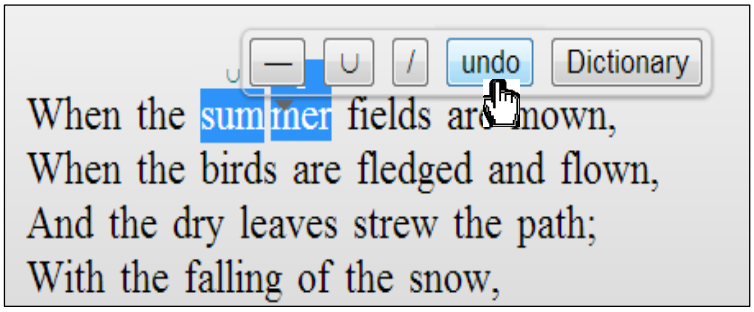
### 4.1.2 Undo

While using the system, it is observable that the users might make some error. To facilitate them to correct their errors, the system provides an undo feature. To remove scansion marks from a word/syllable of a word, the user selects it and clicks undo on the pop-up toolbar. The word/syllable without any scansion will appear in place of the scanned word. The undo feature can be used at any stage of scanning: while marking syllables as stressed or unstressed, while dividing the line into feet or after the result has been displayed.

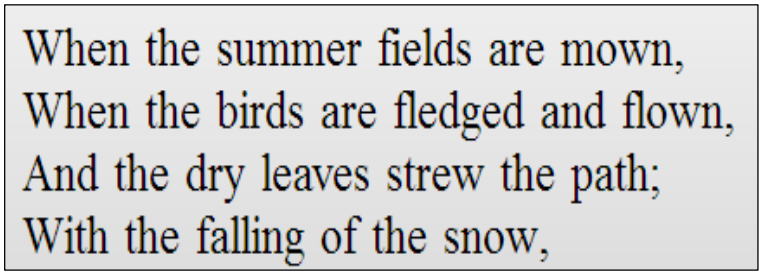
Figure 4.7 demonstrates the use of undo feature. Suppose, a user has marked first syllable "sum" and second syllable "mer" from the word summer as unstressed and stressed respectively. If the user wishes to change the marks on both of syllables, he selects the word "summer" and chooses undo option. Figure 4.7 (c) shows the result of the undo.




(a) Syllables originally scanned




(b) Select the syllables that needs to be undone and click "undo" on popup toolbar

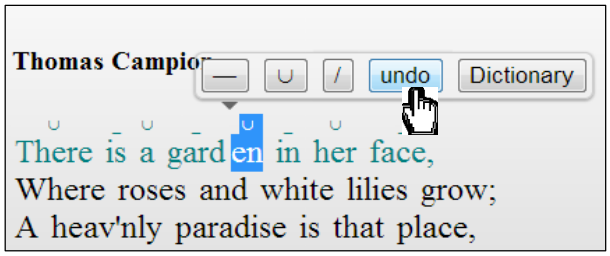



(c) After undo the words return to their original form.

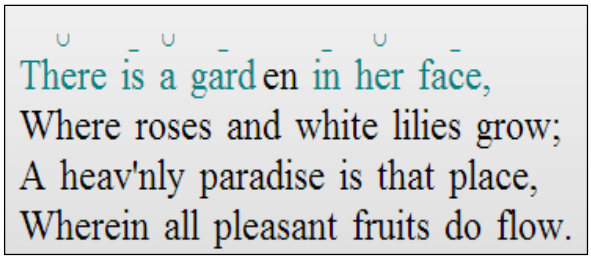
(Henry Wadsworth Longfellow , "Aftermath", 1-4)

**Figure 4.7 Using the undo feature**

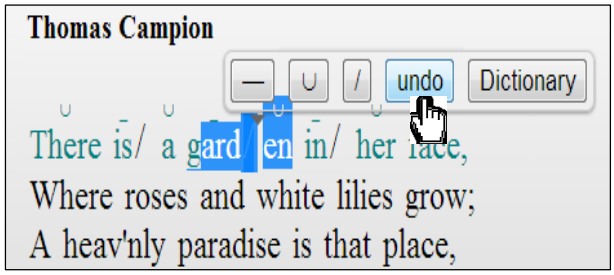
The undo feature will work accurately to remove scansion marks from single syllables, multiple syllables of the same word or syllables of the same word falling under different foot (Figure 4.8).



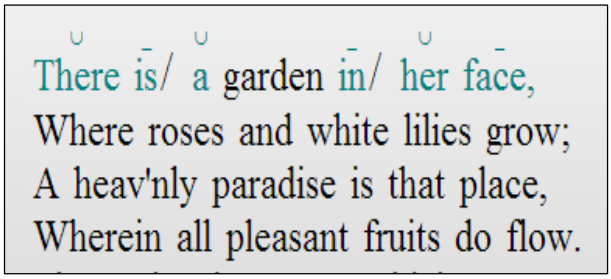

(a) Select the syllable to be undone and select "undo"




(b) Scansion marks removed from the syllable after undo




(c) Select the syllables divided across foot




(d) Scansion marks and the foot symbol removed after undo

Thomas Campion, "There is a Garden in Her face", 1-4)

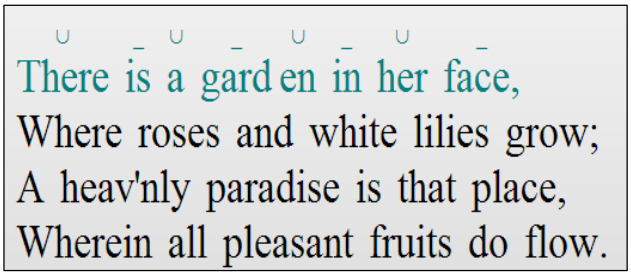
**Figure 4.8 Different cases for using undo**

### 4.1.3 Finding the meter

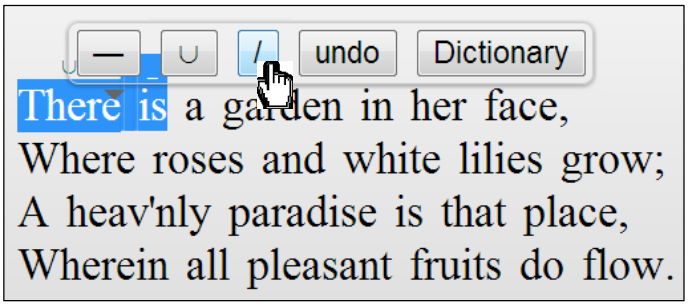
The system also displays the meter in the line of the poem once it has been scanned by the user. When the line has been completely scanned and divided into feet and the user moves to the next line, the meter in the previous line is displayed as soon as the user scans the first syllable of second line.

Figure 4.9(a) shows a line of poetry that has been completely marked by the user. Figure 4.9(b) shows the division of the line into feet. The user selected "There is" and clicked on the "/" button as highlighted. The result of this action is exhibited in Figure 4.9(c). Similarly, the rest of the syllables in the line are divided into feet (Figure 4.9(d)). As soon as the user scans the first word of the next line or any other line, the resulting meter in the

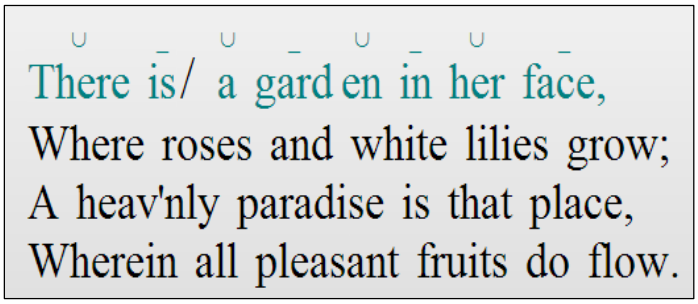
line is displayed. Figure 4.9(e) demonstrates displaying of the resulting meter. Figure 4.9(f) shows a few scanned lines of poetry along with the meter.



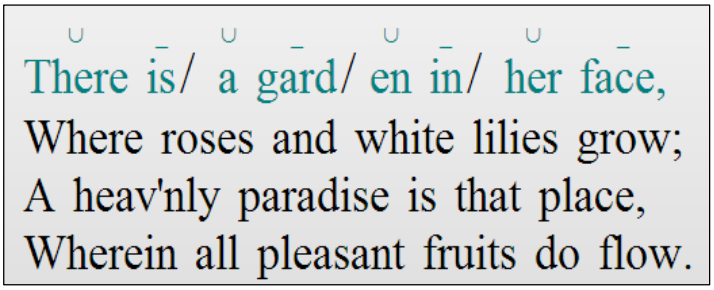

(a) Scan all the syllables in the line



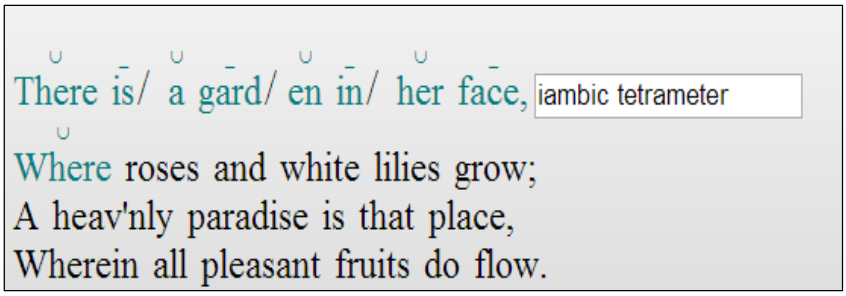

(b) Select the syllables that come under one syllable and click "/" symbol on the pop-up toolbar



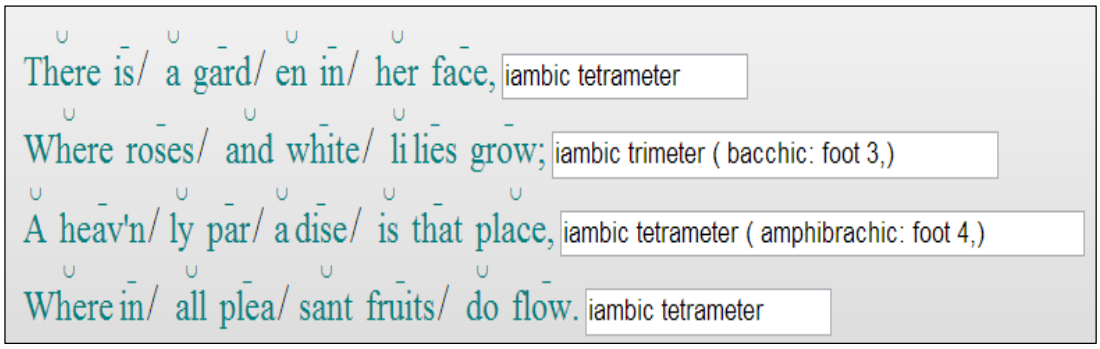

(c) Division of syllables into foot




(d) Division of line into feet




(e) Meter in the line displayed




(f) Meter in all the poetry lines displayed

Thomas Campion, "There is a Garden in Her face", 1-4)

**Figure 4.9 Finding meter in the line**

### 4.1.4 Getting Reviews on Scansion

To provide the user with the instant feedback on the poem they scanned, the system provides the facility to compare their poems with their professor's version of the scanned poem to know where the two versions differ. This feature makes the system useful as a supplement to classroom teaching. Having different versions of scansion does not always mean that the users are incorrect; it may also mean that they interpreted the poem differently. This feature might be useful to the student user group. If the students do not agree with the professor's version, it may induce a positive discussion on the variation from a different perspective leading to understanding of the poems.

The professors can load their scanned version of the poems they wish to teach throughout the course. When a user has scanned a poem, he can compare it to the professor's scanned version by clicking on the "Get Reviews" option on the menu bar (Figure 4.10(a)). On clicking the option, the user is redirected to a page where he can see both the professor's version and his version; user version on left and professor's version on right.

The system gives a visual cue wherever there are variations in the meter in the two versions by changing the background of the meter in the users' version to red (Figure 4.10(b)).


(a) Click on Get Reviews after scanning the poem


(b) Comparing user's copy with the professor's copy

Thomas Campion, "There is a Garden in Her face", 1-7)

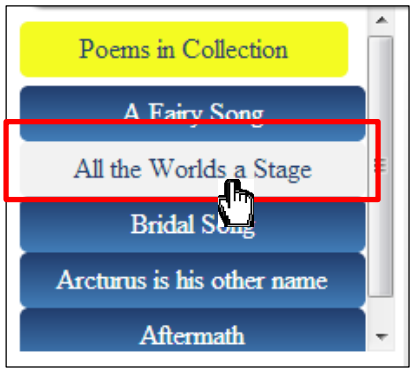
**Figure 4.10 Getting reviews on scansion**

### 4.1.5 Flexibility to Choose Poem

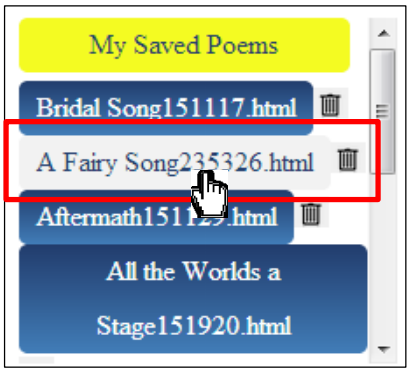
The system gives the flexibility to the user to choose the poems to scan. The system has a collection of poems from which the user can select a poem to scan. To select a poem from database, the user can simply click on any one of the poems from the left panel under "Poems in Collection" (Figure 4.11(a)). The system also allows the users to continue scanning on a previously saved partially scanned poem. The list of all the saved poems appears in the left panel under "My Saved poems" and can be chosen in the same way as the poems in database. (Figure 4.11(b)). The selected poem will be loaded into the work space ready to be scanned (Figure 4.11(c)).

The tool also allows the user to import poems from external sources. To import a poem, the user clicks on the "Load New Poem" option under "Start Scanning" menu option (Figure 4.11 (d)). The option leads the user to a form page where the user has to fill in the

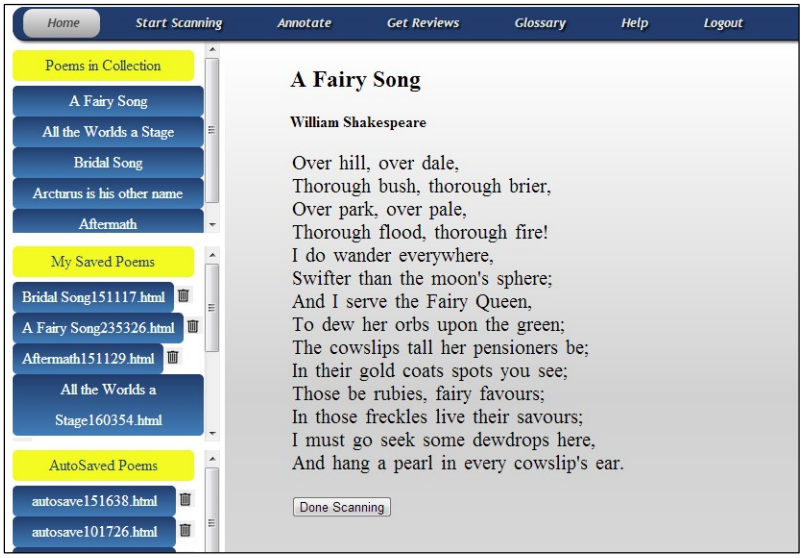
poem's name, poet's name and the poem itself (Figure 4.11 (e)).The poem can be typed in the text area or copied from a source and pasted in text area. On clicking the submit button, the poem is loaded into the workspace to be scanned.




(a) Selecting a poem from the collection

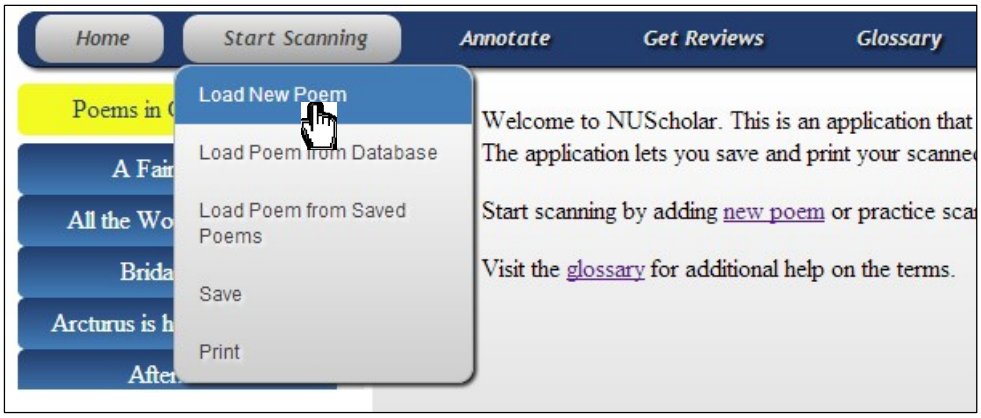



(b) Selecting a poem from previously saved poems.

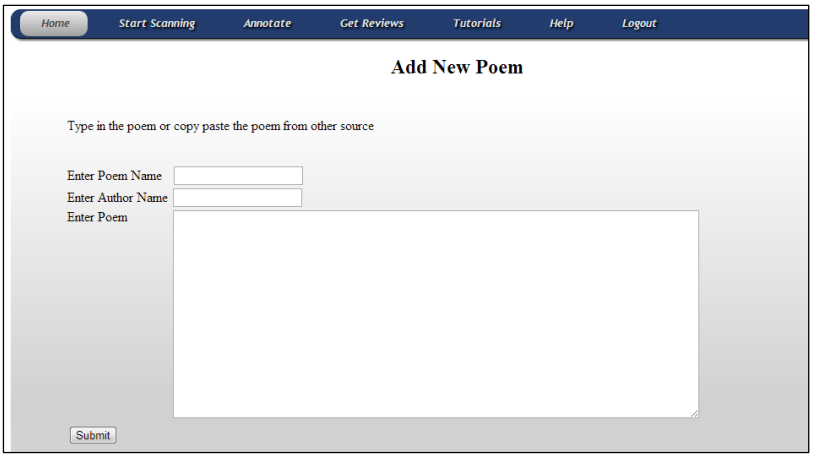



(William Shakespeare, "A Fairy Song")

(c) Selected Poem loaded in workspace




(d) Adding a new poem




(e) Form for adding poem details

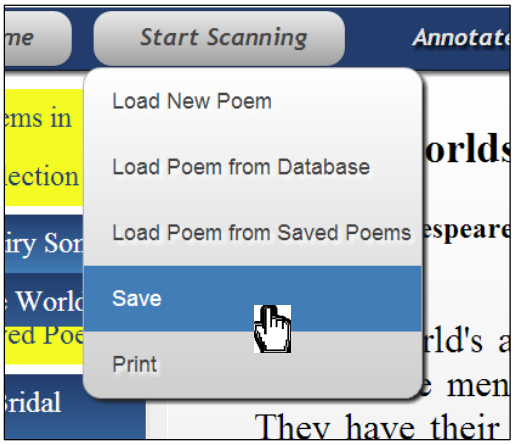
**Figure 4.11 Selecting a poem to scan**

### 4.1.6 Save and Print

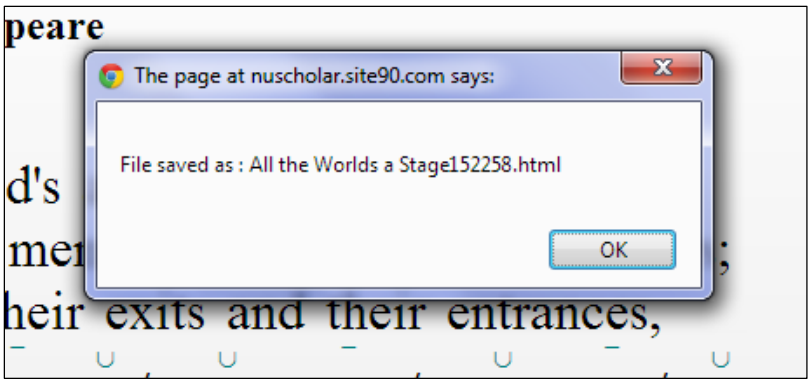
This application allows the users to save their work. Scanned, unscanned and partially scanned poems can be saved to be referenced later. The user can continue scanning or make changes on the previously scanned poems. These saved poems appear under the title "My Saved Poems" in the left panel.

To save a poem, the user can select the save option under start scanning menu option (Figure 4.12(a)). The poem will be saved under the same name as the poem with a number appended at the end of the name which is the time of saving. This number can

make it easier for the user to distinguish between the different versions of the same poem (Figure 4.12(b)).




(a) Choosing the Save option

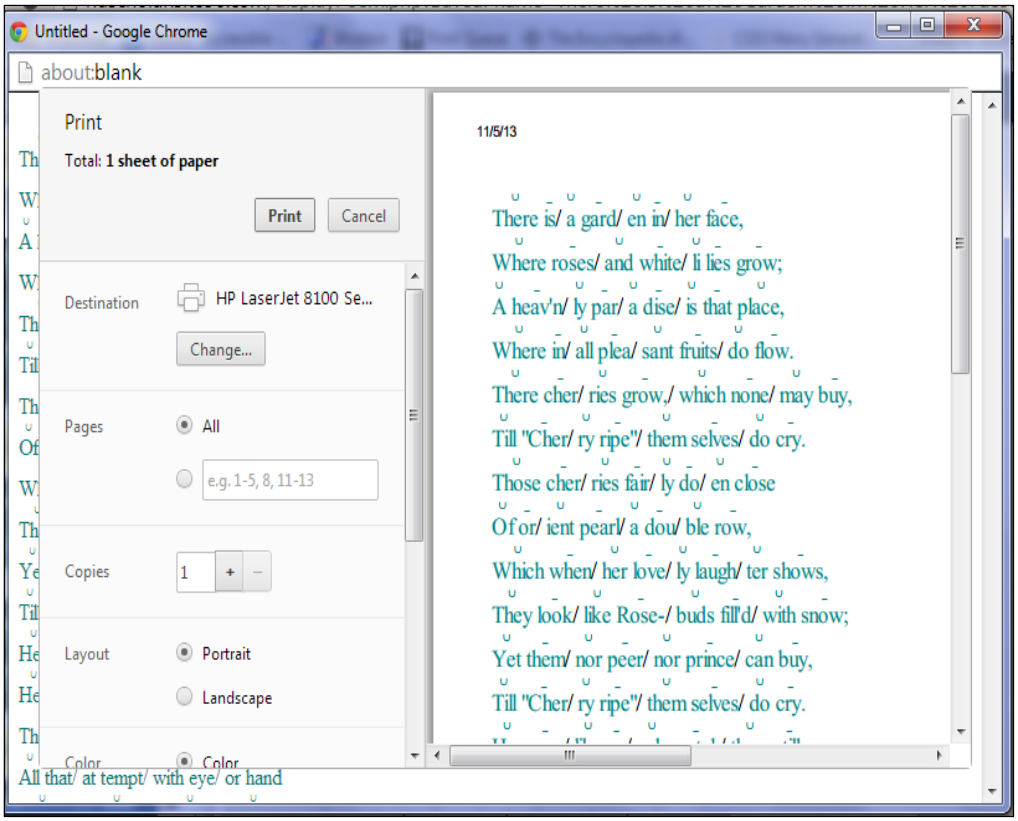



(b) Name automatically given to saved poem

**Figure 4.12 Saving a poem**

The system also facilitates the user to print their work. To print a scanned, unscanned or partially scanned poem, the user simply needs to select the "Print" option under "Start Scanning" menu option (Figure 4.13 (a)). It does not print out the entire browser window but only the poem. A pop-up window will appear giving the control to the user choose the printer and the printing options (Figure 4.13(b)).


(a) Choosing the printing option




(b) Print preview window

Thomas Campion, “There is a Garden in Her face”, 1-13)

**Figure 4.13 Printing a poem**

### 4.1.7 AutoSave

It was evident from researcher's personal experience that the users tend to use a back or forward button while navigating between pages. If the user is scanning the poem and unintentionally hits the backspace/back button, the work done on the current poem will be lost when the last browsed page is loaded.

To prevent the loss of work that could happen in such situations, an autosave feature is provided. If the user presses back button on the browser or hits backspace on keyboard without saving the poem, an autosave version is created for the user. The user can save or delete this auto saved version depending upon their choice. These recovered poems appear in the left panel under the title "AutoSaved Poems" (Figure 4.14) and can be loaded in the same way as "Poems in Collection" and "My Saved Poems".


**Figure 4.14 AutoSaved Poems**

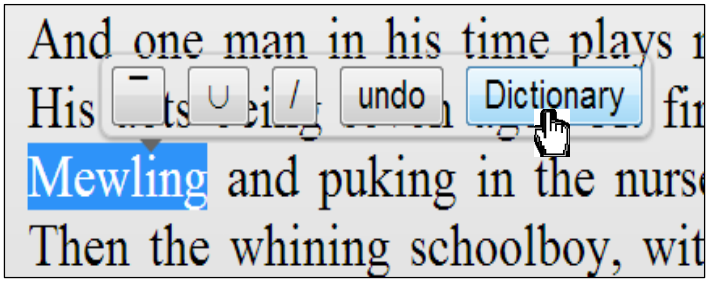
### 4.1.8 Dictionary

The application assists the users in scanning by providing a dictionary feature. The user selects the word he wishes to look the meaning or syllabic description of and clicks on the dictionary option on the pop-up toolbar (Figure 4.15(a)). A function then extracts the word selected by the user and stores it in a variable. The next step involves forming a

query that needs to be fired on the OED's (Oxford English Dictionary) search engine through its URL (Uniform Resource Locator i.e., Internet Address). The example below shows the type of query formed. "selText" is a variable that stores the selected word.

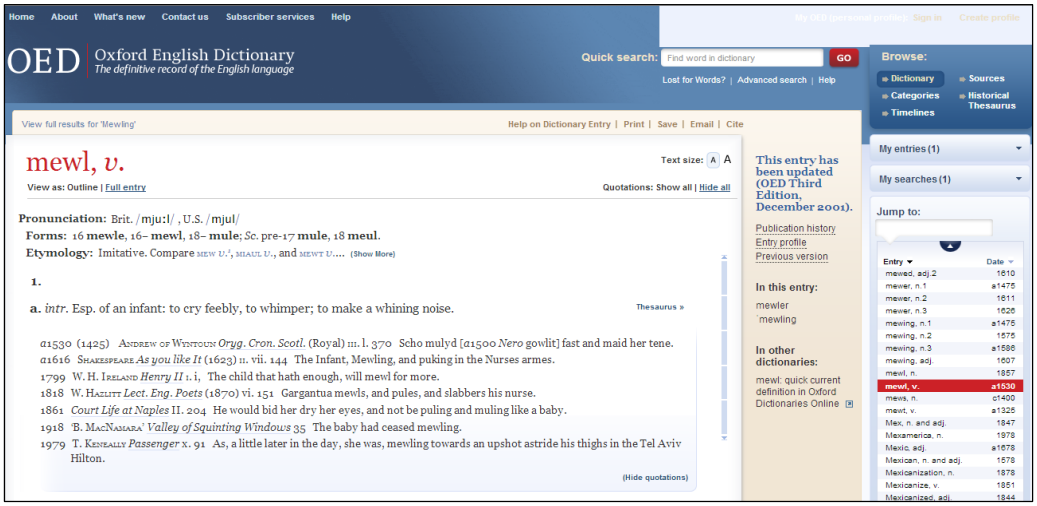
```
http://www.oed.com.ezproxy.library.dal.ca/search?searchType
=dictionary&q="+selText+"&_searchBtn=Search
```

This action opens up a new tab within the same window with the search results of the query (Figure 4.15(b)). This new tab becomes the currently active tab so that the user does not have to manually switch to see the search results.




(William Shakespeare, "All the World's a Stage", 4-7)

(a) Choosing the Dictionary Option



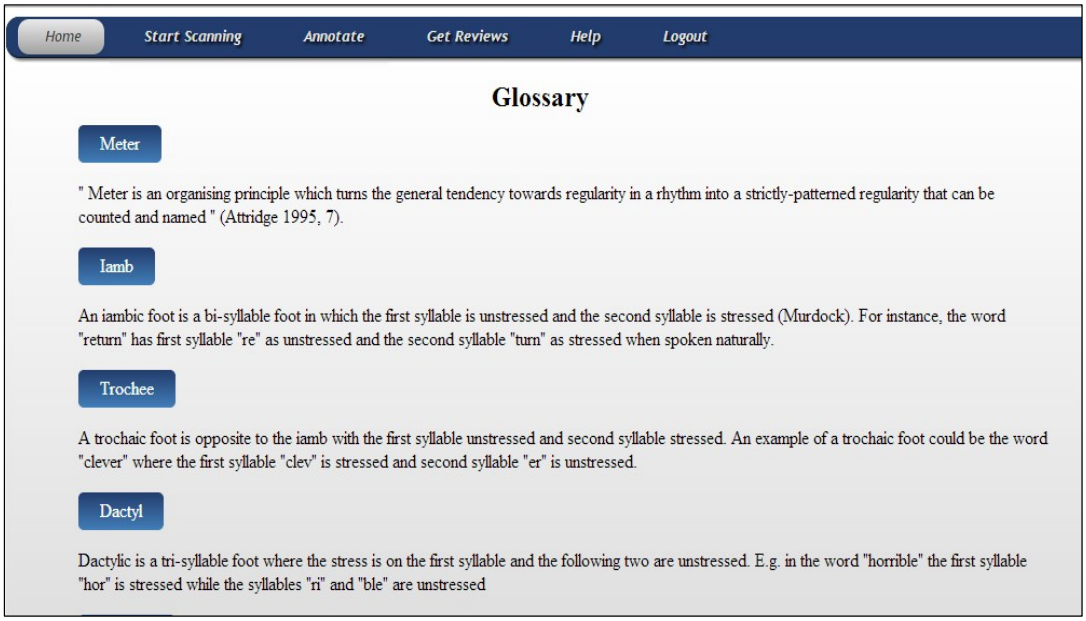

(b) Oxford English Dictionary search results

**Figure 4.15 Using the Dictionary feature**

### 4.1.9 Glossary

There is a possibility that the new users might not be completely aware of the basics of scanning. In order to provide an initial start-up, a glossary is provided to familiarize the users with these terms. On clicking the "Glossary" option on the menu bar, the user is redirected to a page describing the definitions of the basic terms used in the scanning process. The text uses the same definitions of the terms as used earlier in Chapter 2.


(a) Choosing the Glossary option




(b) Glossary page

**Figure 4.16 Glossary**

## 4.2 IMPLEMENTATION

A major contribution of this thesis is the implementation of the scansion application. There was no existing application on which this tool could be extended and the system

required flexibility in many aspects specially while choosing the syllables and dynamic modification of the content, we developed some algorithms particularly to realize these requirements. These algorithms have been discussed in the following sections.

### 4.2.1 Syllable Representation, Selection and Marking

While scanning the poem, the scansion marks need to appear over the respective syllable something similar to the Japanese Furigana. Furigana are the small hiragana characters, a basic syllabic script, placed over kanji, to provide the reading; and are typically used in Japanese newspapers and other texts with difficult or less common kanji (Kirwan, 2003). Furigana is rendered on browsers using ruby tags. Taking inspiration from this, we have used ruby tags to represent the scanned poems.

When the poem in presented to the user, each word is represented as a node in the Document Object Model (DOM) structure and is implemented using HTML5 Ruby tags (`<ruby>`). *Ruby* is the term used for a run of text that is associated with another run of text, referred to as the *base text*. Ruby text is used to provide a short annotation or pronunciation of the associated base text typically used in East Asian documents (Sawicki, Suignard, Ishikawa, Durst, & Texin, 2008) as shown in Figure 4.17.

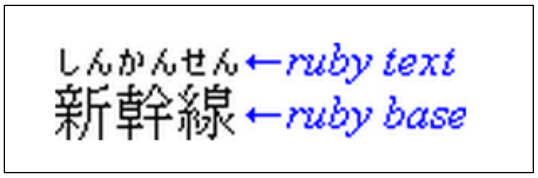
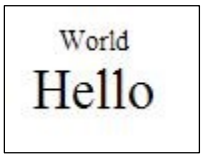



**Figure 4.17 The use of ruby tags (Sawicki, Suignard, Ishikawa, Durst, & Texin, 2008)**

Getting inspiration from this, we represented each word of the poem as a ruby base and the scansion mark as a ruby text in the development of the scansion application for this thesis. This concept was realized using HTML5 Ruby tags as displayed in Figure 4.18.




(a) An example of ruby base and ruby text

```
<ruby>
    <rb>Hello</rb>
    <rt>World</rt>
</ruby>
```

(b) Representation in HTML

**Figure 4.18 Representation of ruby base and ruby text in HTML**

The tags have to be in the same order as described above to correctly display the ruby base and corresponding ruby text.

As explained earlier, scanning of the syllables begins with selecting the syllable and putting the appropriate mark over it. The underlying code works by the following sequence of steps.

Step 1: Select the syllable/word using the mouse cursor.

Step 2: The ID of the node that contains the selected text is determined. If the selected portion has not been previously marked, the algorithm proceeds to next step otherwise terminates.

Step 3: The selected part of the word is compared with the actual word to determine its relative position in the word. Depending upon this relative position, the word is divided into substrings of selected and unselected syllable.

Step 4: Ruby node is created for the selected syllable with ruby base as the syllable and ruby text as the mark selected by the user from the pop-up toolbar to be put over. Ruby node(s) for the unselected portion of word as ruby base are created with blank ruby text.

Step 5: These ruby nodes are then adjusted in the DOM structure at the appropriate position and replacing the original ruby node.

To divide a line into foot, the following set of steps works in the background.

Step 1: All the syllables the user believes that come under one foot are selected.

Step 2: Find out the last node in the selected text.

Step 3: A node having ruby base as a forward slash ("/") is appended to the last selected node to visually divide the syllables from the rest of the line.

### 4.2.2 Finding the Meter in the Line

As explained in the earlier sections, the system displays the meter in the line once it has been scanned and the user moves over to scan another line. A line can be in one of the three states in the process of being scanned:

State 1: A line which currently being marked by the user is in State 1

State 0: A line which has been marked by the user, the resulting meter has been calculated but has not yet been displayed to user is in State 0.

State −1: A line on which the scanning has been completed and the resulting meter has also been displayed is in State −1.

The algorithm uses 2 pre-created hash tables:

1. The first hash table stores key value pairs of symbolic foot pattern and their corresponding formal term used in writing the meter.
2. The second hash table stores the key value pairs of the number of feet (in numerals 1, 2, 3,..) and the formal terms used for the number of feet.

The system works conferring to the following steps to display the meter.

Step 1: Update the current line's state to 1.

Step2: Find out if there is any syllable that has not been marked by the user by checking the ruby text of all the ruby tags in the line under consideration. If a ruby tag has blank ruby text, end the algorithm. If not, proceed to step 3.

Step 3: Create a string S by appending the scansion symbols that appear over the words in the order they appear. The scansion symbol is the ruby text.

Step 4: If a foot division is encountered within the line, append a forward slash "/" to S.

Step 5: Continue Step 3 and 4 until the entire line has been iterated over.

Step 6: Split S, wherever a forward slash is encountered, into an array A such that each array index has a series of scansion symbols that occur in a foot.

Step 7: Find out the highest occurring pattern but counting the number of times each pattern exists in A and selecting the pattern with the highest count. If only one type of foot occurs throughout the line, the line will have a single predominant foot. If other type

of foot also exists in the line, there will be a variant foot in an otherwise predominant meter.

Step 8: Find out the location of the variant foot (feet), if any, in A.

Step 9: Find the number of feet in the line from the length of A.

Step 10: Translate the symbolic foot patterns and number of feet into the formal terms. E.g. the pattern ( ˘ ¯ ) is translated to iambic, the pattern ( ¯ ˘ ¯ ) is translated to cretic. If the line has 3 feet, it is translated to trimeter; 5 feet are translated to pentameter. All these translations are carried out by comparing to the hash tables, storing different key value pairs, defined at the beginning of the steps.

Step 11: The results are stored in 3 hash tables:

1. hashFoot: containing the key value pair of line number and the formal term for number of foot.
2. hashMeter: containing the key value pair of line number and the formal term for the type of predominant foot.
3. hashVariantFoot: containing the key value pair of line number and the formal term for the type of variant foot.

Step 11: Change the state of the line from 1 to 0.

Step 12: When the current line changes, i.e. user starts to scan another line, display the result of the lines in state 0 and change their state from 0 to –1. See Figure 4.19 for state transitions.

Step 13: Follow steps 1 – 12 for all other lines.

Step 14: When the last line is scanned and there is no line left to be scanned, the results will be calculated automatically but will be displayed on clicking the “Done Scanning” button at the end of the poem which will perform Step 12 for the last line.

### 4.2.3 Undo

Having the option to correct mistakes is indubitably an essential feature that all systems should provide. The scansion tool provides the facility as explained in the previous section. After selecting the syllable or word on which the scansion mark needs to be removed and clicking “undo” on pop-up toolbar, the following steps occur in the background to make the mark disappear.

Step 1: To find out the IDs of all the nodes that come under the selected text, the most common ancestor of the selected nodes is first determined.

Step 2: A loop is then iterated over all the children of the ancestor node to determine if they have been under selection. If they are, their IDs are pushed into an array “selectedNodes”. The elements in the “selectedNodes” are the nodes that the user selected.

Step 3: The ruby base in all these elements is concatenated to form the “original word” in the form it was first presented to the user before being divided into syllables and scanned. However if a forward slash is encountered, it is not appended to the “original word” string.

Step 4: A new ruby node is created with ruby base as the "original word" but no ruby text and appended at the end of the selected nodes.

Step 5: Remove the selected nodes from the DOM structure.

The algorithm for Undo also complies with the state changes, as discussed in Section 4.2.2, of the line in which undo occurs. The following State Transition Diagram would make it more lucid to follow the state changes in a line for the various operations.

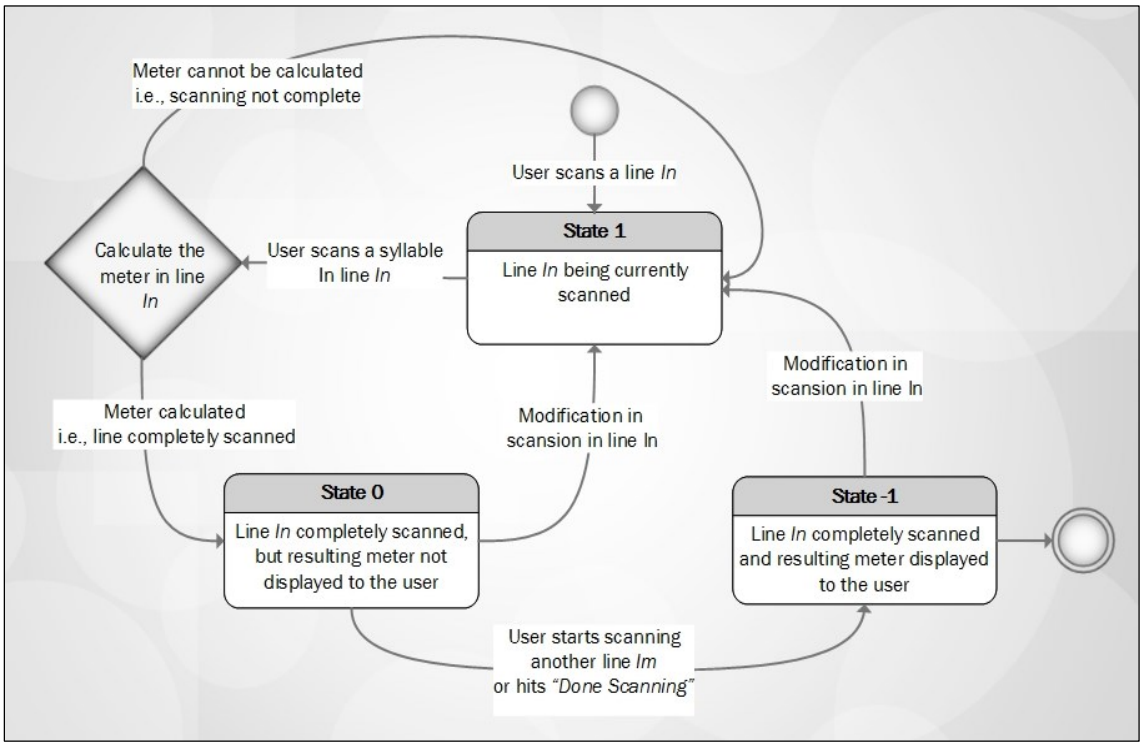



**Figure 4.19 State Transition Diagram representing the different states of a line in poem**

In this chapter we discussed what features the system offers and how to use these features. We also described what design challenges were faced in the implementation of some of these features and how they were overcome. We also discussed some important algorithms which were specifically designed for the some of the typical operations in

scansion. In the next chapter, we will discuss the process involved in the evaluation of the application from the prospective users of the application.

# CHAPTER 5 FIELD EVALUATION OF NUSCHOLAR SCANSION TOOL

We conducted a field evaluation to gather user reaction to the tool we developed. This chapter discusses the methodology of the study including the objective behind the study, study population, procedures involved followed by the result presentation.

## 5.1 RESEARCH OBJECTIVES

The field evaluation was conducted to fulfill the following research objectives:

1. To determine if the system performs the scansion task in the way the stakeholders (the poetry teachers) want.

The application was developed for two group of users, namely poetry students and teachers, it was necessary to know if the system allows them to do what they normally do while analysing the scansion of a poem. Although the stakeholders of the application were poetry teachers and students at Nipissing University, this application could be used by any individual who would want to practice scansion since the same scansion principles are followed by all the students and teachers of poetry. So we can assume that the group that could be benefitted through this application includes all the poetry teachers and students.

2. To determine if the system is easy to learn and easy to use.

If an application is developed, which is the first successor of paper; it becomes difficult to migrate from the paper to the computers due to the apparent ease of using paper. So, another objective was to see if the users found the system easy to learn and use

3. To determine to what extent the additional features provided by the system are useful.

4. To get a qualitative feedback for the system to understand what aspects of the system need improvements and what aspects the participants liked.

## 5.2 Study Design

### 5.2.1 Study Population and Recruitment Procedures

We recruited participants who either teach poetry or study poetry and who use paper or some other method to scan the poems since the system is primarily designed to fulfill this particular need.

The participants were recruited from Dalhousie University by sending the recruitment notice via e–mail. The recruitment process was carried out and monitored by the researcher herself. The participants were asked to self-select themselves based on the inclusion and exclusion criteria, no further screening measures were employed.

### 5.2.2 Participants

The field study was conducted with 8 participants (6 poetry teachers at Dalhousie University and 2 graduate students from the English department having experience in scansions and had been a teaching assistant for scansion related courses). The participants acted as surrogates to the actual stakeholders in the terms that they evaluated the application on their behalf and represented the user group of teachers of poetry. We believed that this sample size would be sufficient to obtain the feedback for the system. The participants were allotted individual sessions at times that were convenient for them.

### 5.2.3 Study Protocol

All participants involved in this study signed an informed consent form. The process was administered by the researcher. The consent was sought at the beginning of the first session. The informed consent form outlined the risk and benefits associated with the study, a description of the study, the participant's right to withdraw without consequence, and assurances of confidentiality and anonymity of personal data.

The introductory session and the post-practice session were conducted in a quiet meeting room. For the practice session, the system was given out to all the participants to be used as they would use it in their real life without having a controlled laboratory environment. All the participants were required to participate in all three sessions.

In the first session, the participants were given an introduction to the system. They were also provided a username and password to login in the system. They were given a demonstration on how to scan the poem, save the work, add new poems and use other features. The participants tried the features on their own and cleared any doubts they had on the using the system/features.

During the Practice session, the participants were required to use the system to scan at least 5 poems or use the system for 90 minutes or until they had.

The post-practice session (Session 3) was conducted in individual session according to the participant's availability. During this session, the participants were given a questionnaire (Appendix E) asking them to rate different features based upon their experience with the system followed by open-ended questions about the usability of the

application. They discussed their experience with using the system and commented on the system's performance through these question in the discussion.

### 5.2.4 Data Collection

The researcher took notes on paper and audio recording of every participant's first and last session. Session 2 was monitored using the logs from the system. The participant's feedback and comments for the system's performance on different aspects were also taken in the post-practice questionnaire (Appendix E) in Session 3. The questionnaire consisted of 30 questions taken from QUIS 7.0 (Norman & Shneiderman) and 10 open–ended questions about the system's usability.

## 5.3 Results

This section reports the results from the questionnaire and discussion in the post-practise session. The results from the questionnaire are discussed in two parts: background questions and user satisfaction ratings.

### 5.3.1 Background Questions

The participants were asked how often they normally scan the poems. Their responses are depicted in Figure 5.1. Two of the 8 participants reported that they scanned poems very frequently while 6 of the participants reported that they did it only occasionally.

It was asked as well as observed from the logs records that 2 out of 8 participants used the system for less than 1 hour while 1 of them used it for 3-5 hours. The rest of the participants used the application for 1-3 hours. Figure 5.2 describes the responses on this question from the participants.

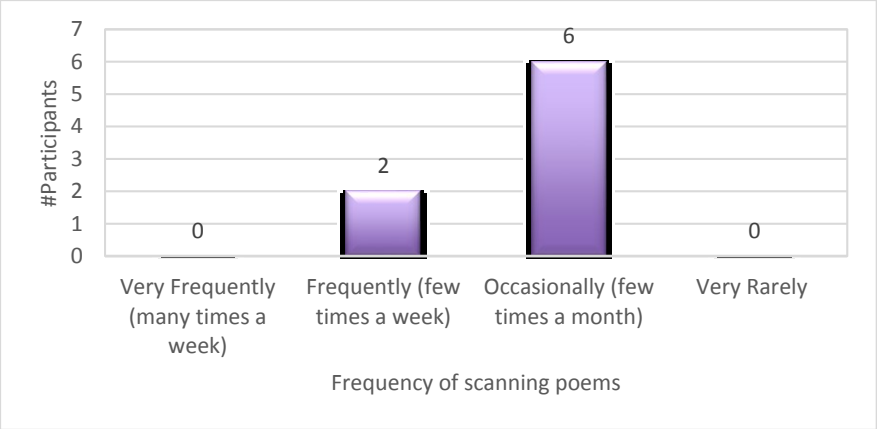



**Figure 5.1 How often do you scan poems?**

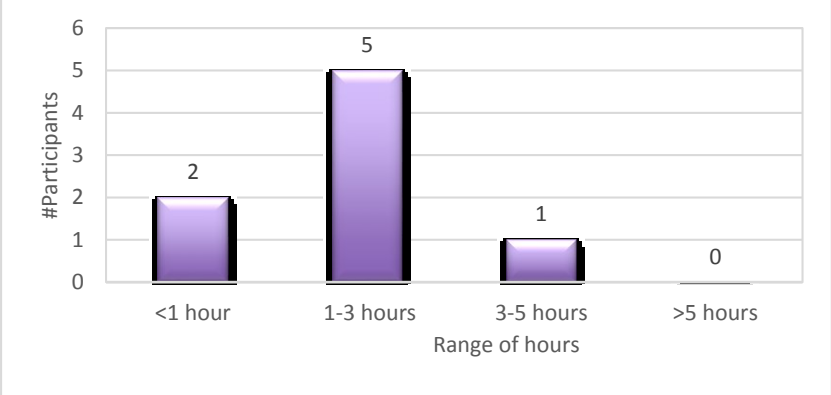



**Figure 5.2 How long have you worked on the system?**

### 5.3.2 User Satisfaction Ratings

The users were asked to rate different features of the system on a scale of 1–7. The questions focussed on aspects like overall reactions to the system (Section 5.3.2.1), screen (Section 5.3.2.2), terminology and system information (Section 5.3.2.3), learning (Section 5.3.2.4), and system capabilities (Section 5.3.2.5). The responses to these aspects are discussed in the following sections.

#### 5.3.2.1 Overall reactions to the system

(a) 1=Terrible, 7=Wonderful

Six out of 8 participants rated the application as 6 in terms of being terrible to wonderful while 2 of them gave a rating of 5 with the median being 6. Figure 5.3 gives the graphical representation of the data.

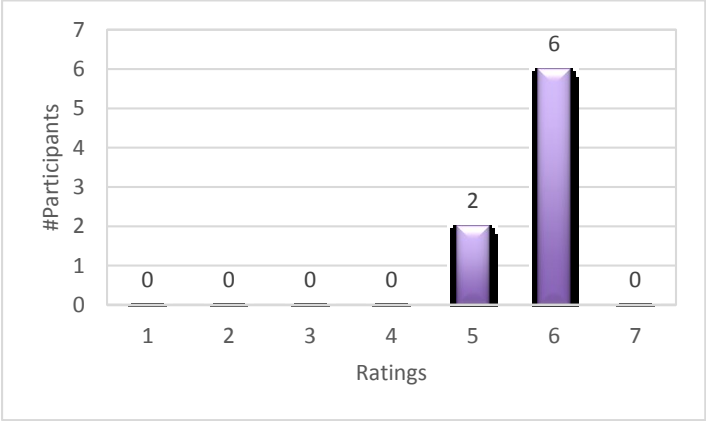



**Figure** 5.3 **Overall Reactions to the system: 1=Terrible, 7=Wonderful**

(b) 1=Frustrating, 7=Satisfying

An interesting trend was seen in the question where the participants were asked to rate the application being Frustrating or satisfying. Two participants gave a score of 4, 2 of them gave a rating of 5, another 2 of them rated it as 6 and last 2 of them rated it as 7. The median was calculated to be 5.5 with the lowest rating being 4 and highest rating being 7 as shown in Figure 5.4.

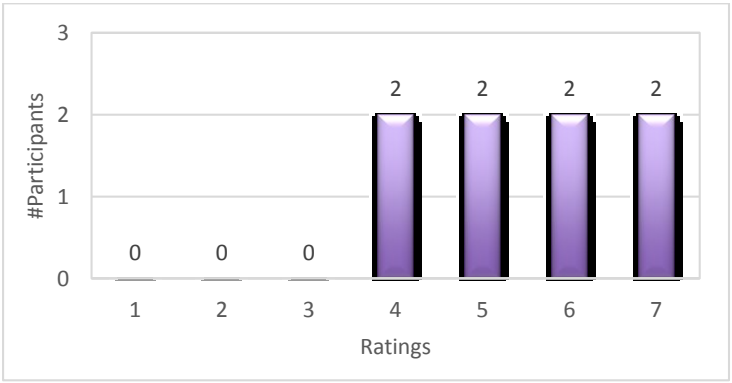



**Figure 5.4 Overall Reactions to the system: 1= Frustrating, 7= Satisfying**

(c) 1= Dull, 7= Stimulating

Five out of 8 participants rated this feature as 5, 2 of them rated it as 6 while one participant assigned a rating of 7. The median was found out to be 5.5 with the ratings lying between 5 and 7 respectively as shown in Figure 5.5.

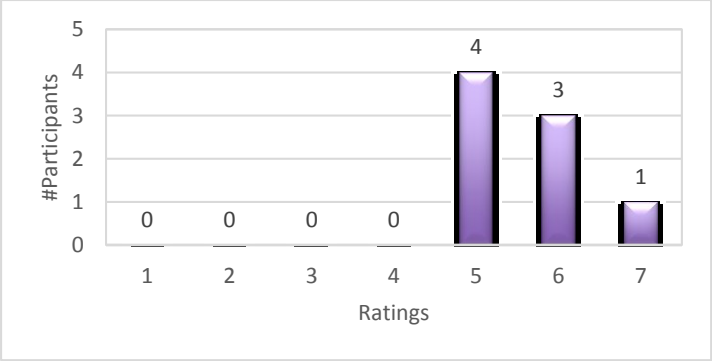



**Figure 5.5 Overall Reactions to the system: 1= Dull, 7= Stimulating**

(d) 1=Difficult, 7=Easy

Majority of the participants found it to be easy to use with 2 of them giving a rating of 5, 3 and 2 of them rated it as 6 and 7 respectively. One participant found it a little difficult to use and choose to score it as 3. The median of the data shown in Figure 5.6 came out to be 6 with the ratings ranging from 3 to 7.

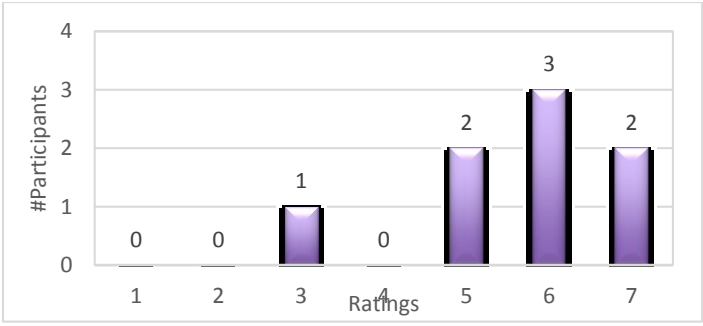



**Figure 5.6 Overall Reactions to the system: 1= Difficult, 7= Easy**

(e) 1= Rigid,7=Flexible

Two participants rated the application as 6 on this aspect while 2 each rated it as 4 and 5 respectively. One of them rated it as 7. The median of the data came out to be 5.5 with the range of rating lying from 4 to 7.

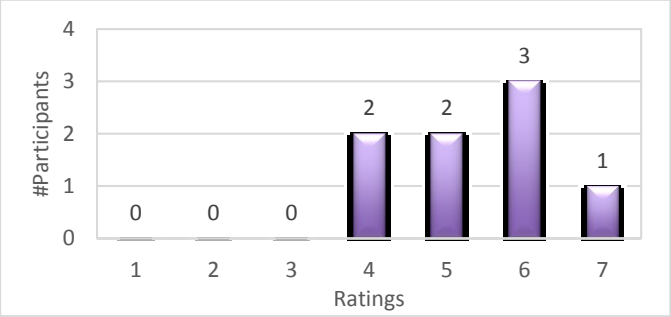



**Figure 5.7 Overall Reactions to the system: 1= Rigid, 7= Flexible**

### 5.3.2.2 Screen

The participants were asked to different aspects of the user interface. The questions were critical to the system's performance since the user had to perform close interactions with the text and its manipulation and it was necessary to understand if the text and other elements were arranged properly for such interactions and were visible enough.

(a) Characters on the computer screen 1= Hard to read , 7= Easy to read

Four of the participants assigned a rating of 6 while the other 4 assigned a rating of 7 to the application as shown in Figure 5.8. The median was calculated to be 6.5 and the rating lying between 6 and 7.

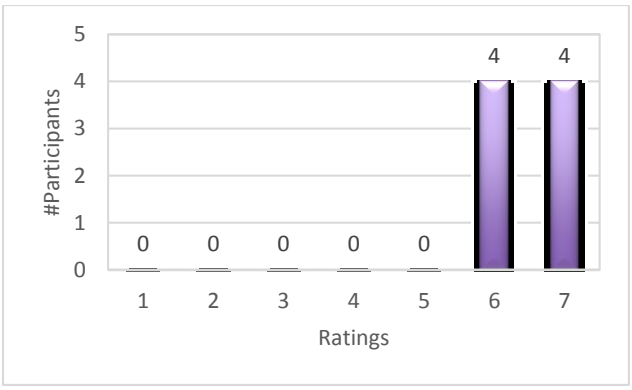



**Figure 5.8 Characters on the computer screen: 1= Hard to read, 7= Easy to read**

(b) Was the highlighting on the screen helpful : 1= Not at all, 7=Very much

Five out of 8 participants assigned a rating of 6 while the remaining 3 participants assigned a rating of 3, 4 and 7 respectively as shown in Figure 5.9. The median of the data was calculated to be 6 with the rating responses lying from 3 to 7.

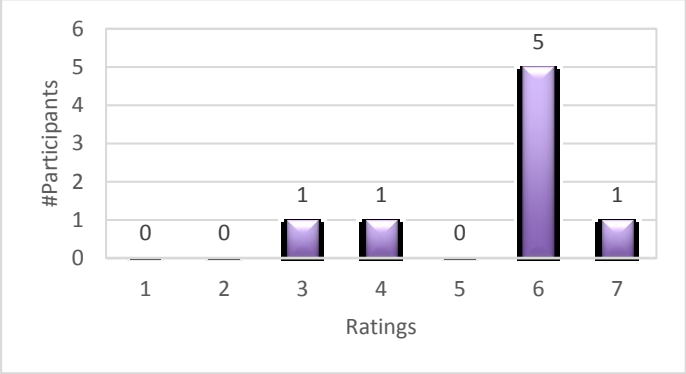



**Figure 5.9 Was the highlighting on the screen helpful: 1= Not at all, 7=Very much**

(c) Were the screen layouts helpful: 1= Never, 7= Always

Two of the 8 participants assigned a rating of 5 on this aspect. Another 3 of them rated the application as 6 while the remaining three rated the application as 7 on the basis of the screen layouts being helpful. The median was found out to be 6 with the ratings ranging from 5 to 7.

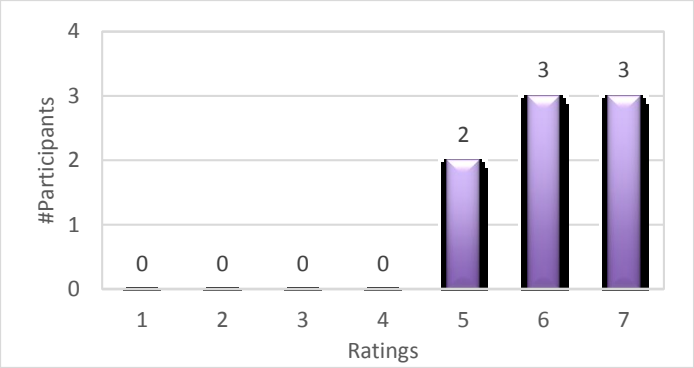



**Figure 5.10 Were the screen layouts helpful: 1= Never, 7= Always**

(d) Amount of information that can be displayed on screen: 1=Inadequate, 7= Adequate

Two of the 8 participants rated this aspect of the application as 5, 4 of them rated it as 6 while the remaining 2 of them rated it as 7. The median of the rating came out to be 6.0 with 5 and 7 as least and highest rating.

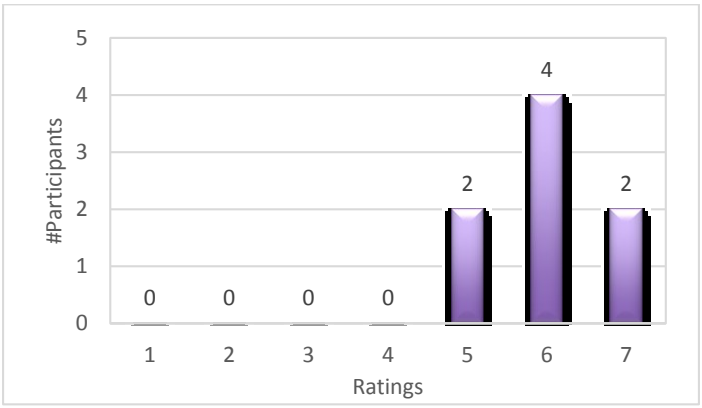



**Figure 5.11 Amount of information that can be displayed on screen: 1=Inadequate, 7= Adequate**

(e) Arrangement of information on screen: 1= Illogical, 7= Logical

Four of the participants rated this aspect of the application as 7 while 3 of them rated it as 6. One of them assigned a rating of 5 to this aspect. The median of the data was calculated to be 6.5 with the range of lying between 5 and 7.

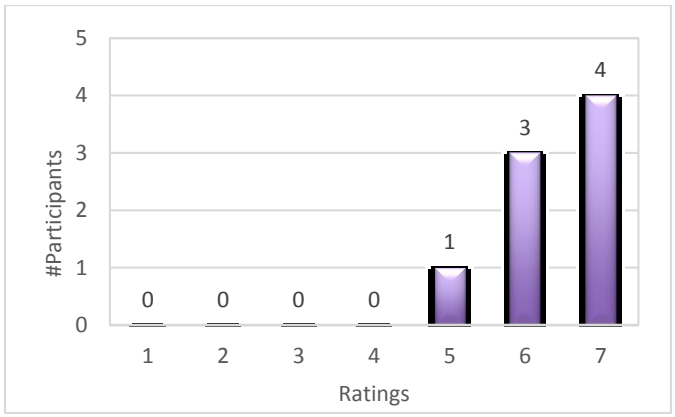



**Figure 5.12 Arrangement of information on screen: 1= Illogical, 7= Logical**

(f) Sequence of screens: 1=Confusing, 7=Clear

The trend was similar on this aspect as the previous aspect of the application. Four of the 8 participants rated this feature as 7 while three of them assigned it a rating of 6. One of them gave a rating of 5. The median was found out to be 6.5 with the range of data lying between 5 and 7.

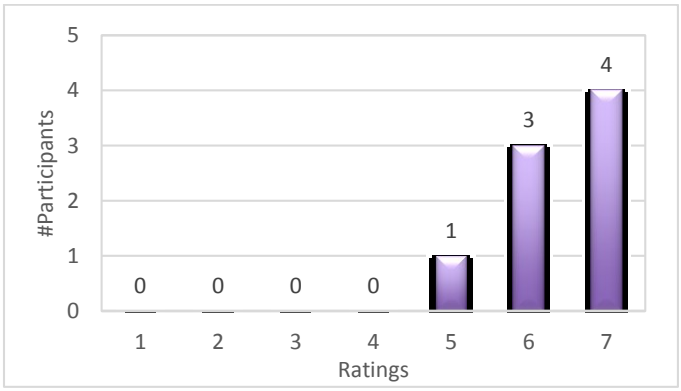



**Figure 5.13 Sequence of screens: 1=Confusing, 7=Clear**

### 5.3.2.3 Terminology and System Information

Since the terminology used in scansion is typical to the work being done and has a crucial role in the contributing towards understanding of the poetry, it was mandatory to evaluate

the terminology used in the application from different aspects. The users were asked 6 questions related to the terminology:

(a) Use of terms throughout the system: 1= Inconsistent, 7= Consistent

Five out of 8 participants rated the application as 7 on the criteria of consistent usage of terms while rest of the three participants rated the application as 6, 5 and 4 respectively. The median was found out to be 7 with 4 being the lowest rating assigned and 7 being the highest.

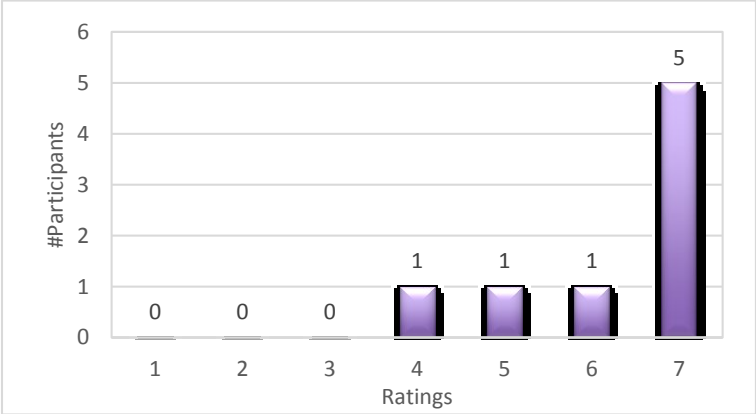



**Figure 5.14 Use of terms throughout the system: 1= Inconsistent, 7= Consistent**

(b) Does the system terminology relate well to the work you are doing: 1= Unrelated, 7= Related

Three and 2 participants out of 8 assigned a rating of 7 and 6 respectively while the other 2 and 1 participant rated the application as 5 and 4 respectively. The median came out to be 6 with the data lying between 4 and 7. Figure 5.10 presents the data from this question.

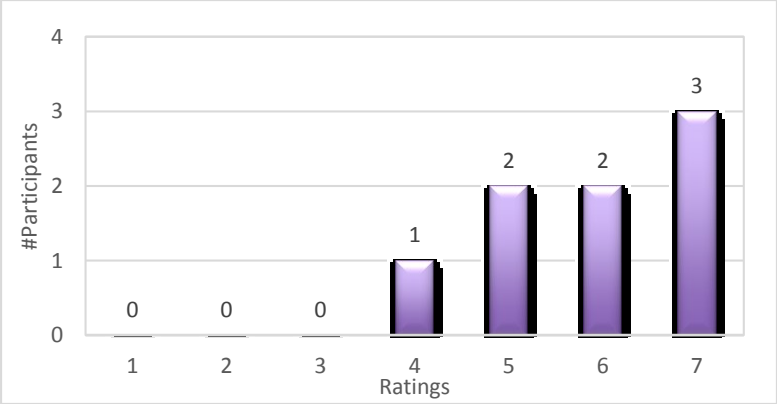



**Figure 5.15 Does the system terminology relate well to the work you are doing**

**1= Unrelated, 7= Related**

(c) Messages which appear on the screen: 1= Inconsistent, 7= Consistent

The participants found out the messages to be consistent, with 3 and 4 of them giving a rating of 7 and 6 respectively while one of them assigned a score of 4. The median was calculated to be 6 with the range of data lying between 4 and 7.

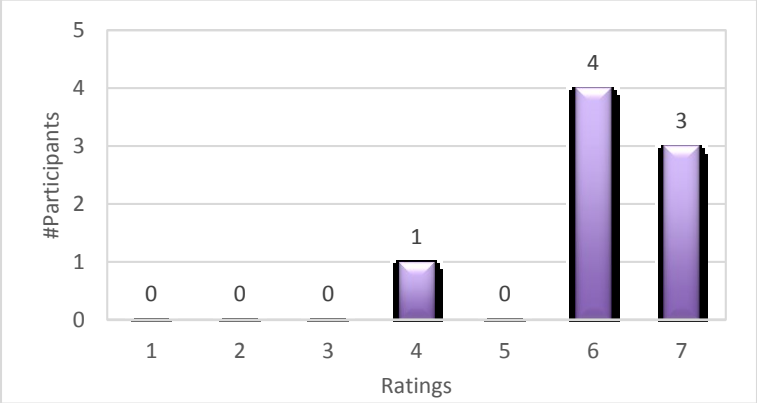



**Figure 5.16 Messages which appear on the screen: 1= Inconsistent, 7= Consistent**

(d) Messages which appear on the screen: 1=Confusing, 7= Clear

Three participants assigned a rating of 7 while other 3 assigned a rating of 6 to the application on the messages being clear or confusing. One participant each rated the

application as 5 and 4 respectively. The median of the data came out to be 6 with the range of ratings lying between 4 and 7.

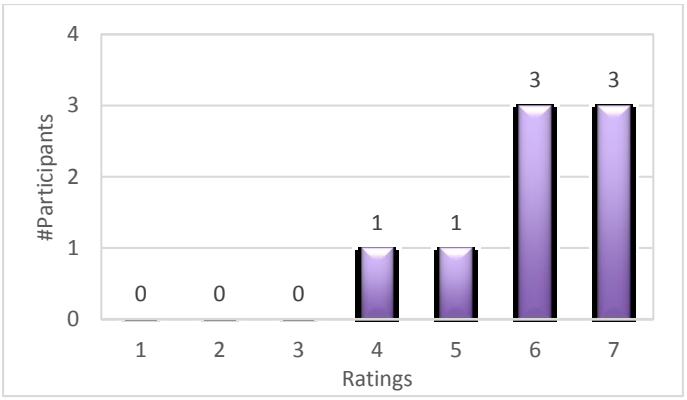



**Figure 5.17 Messages which appear on the screen**

**1=Confusing, 7= Clear**

(e) Does the system keep you informed about what it is doing: 1= Never, 7= Always

Four out of 8 participants allocated a rating of 6 while 2 and one of them rated it to be 5 and 7 respectively. One participant assigned a rating of 3. The median of the data was calculated to be 6 with the minimum rating as 3 and highest rating as 7. Figure 5.13 could be consulted for the data distribution.

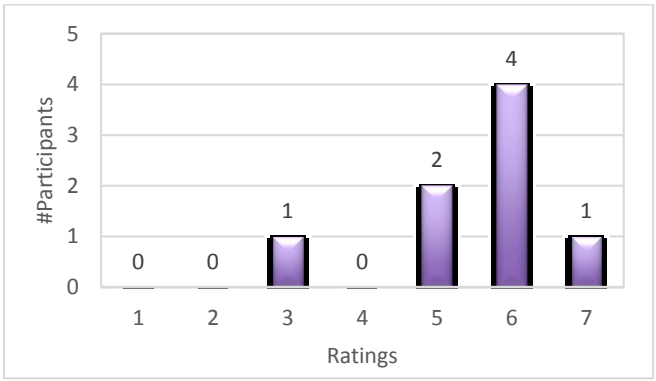



**Figure 5.18 Does the system keep you informed about what it is doing?**

**1= Never, 7= Always**

(f) Error messages: 1= Unhelpful, 7= Helpful

Four of the participants assigned a score of 5 to the error messages while 2 of them allotted the rating 6 and 7 respectively. The median of the data was observed to be 5 with 5 and 7 being as lowest and highest ratings respectively. Two participants marked this as Not Applicable as they might not have encountered any error messages.

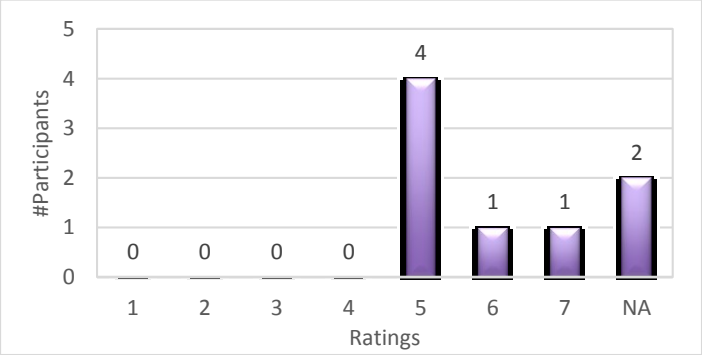



**Figure 5.19 Error messages: 1= Unhelpful, 7= Helpful**

### 5.3.2.4 Learning

It was crucial for the researchers to evaluate the learning process involved with the application. We asked the participants a set of questions concerning the learnability which are discussed as follows.

(a) Learning to operate the system: 1=Difficult, 7=Easy

Five of the participants rated the aspect of leaning to operate the system as 6 and 7. Two of them assigned a rating of 5 while one participant assigned a rating of 3. The median score was 6 with ratings ranging from 3 to 7.

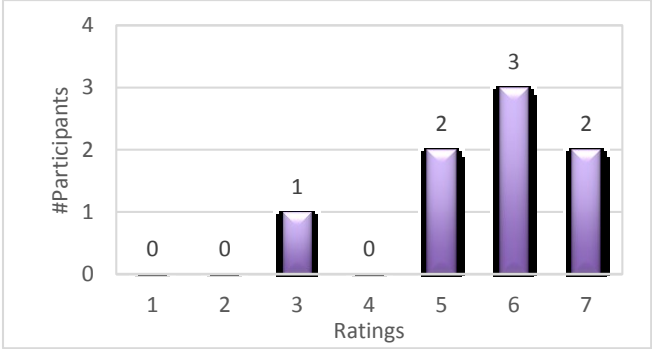



**Figure 5.20 Learning to operate the system: 1=Difficult, 7=Easy**

(b) Exploration of the features by trial and error: 1=Discouraging, 7= Encouraging

Five participants assigned a rating of 6 to the application while 1 and 2 of them assigned a rating of 7 and 5 respectively. The median came out to be 6 with 5 as the lowest rating and 7 as the highest rating.

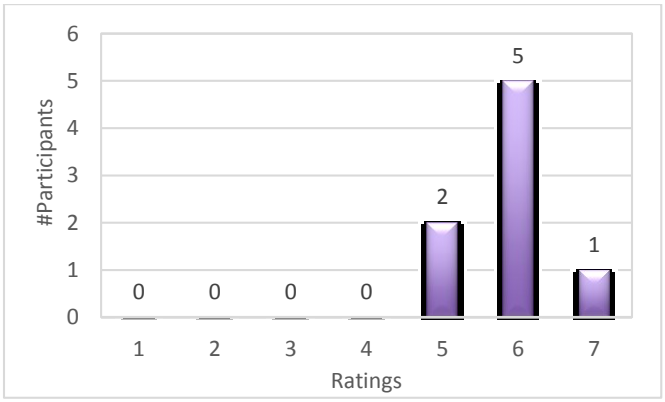



**Figure 5.21 Exploration of the features by trial and error**

**1=Discouraging, 7= Encouraging**

(c) Can the tasks be performed in a straightforward manner: 1=Never, 7= Always

Four and three participants rated the application as 6 and 5 respectively on this aspect and one of them assigned a rating of 4. The mean of the data came out to be 5.5 with the rating data lying between 4 and 6.

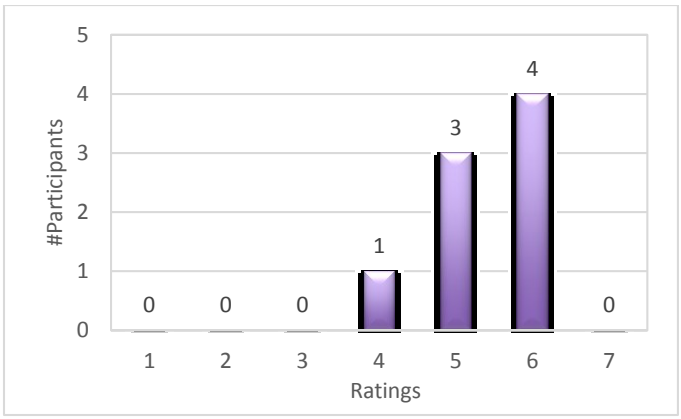



**Figure 5.22 Can the tasks be performed in a straightforward manner?**

**1=Never, 7= Always**

(d) Number of steps per task: 1= Too many, 7= just right

Four participants assigned a rating of 6 on this feature while 2, 3 and 5 rating was given by 1, 2 and 1 participant respectively. The median was calculated as 6 with a range the range of data lying between 2 and 6. Rating distribution is as shown in Figure 5.18.

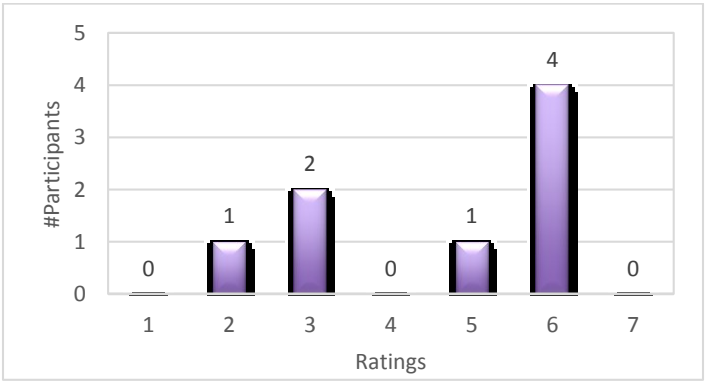



**Figure 5.23 Number of steps per task: 1= Too many, 7= just right**

(e) Steps to complete a task follow a logical sequence: 1= Too many , 7= Just right

Four of the participants gave a rating of 6 on this aspect while 3 of them gave a rating of 4 and 5 respectively. One participant assigned a rating of 7. The median of the data was calculated to be 5.5 with a range data varying from 4 to 7

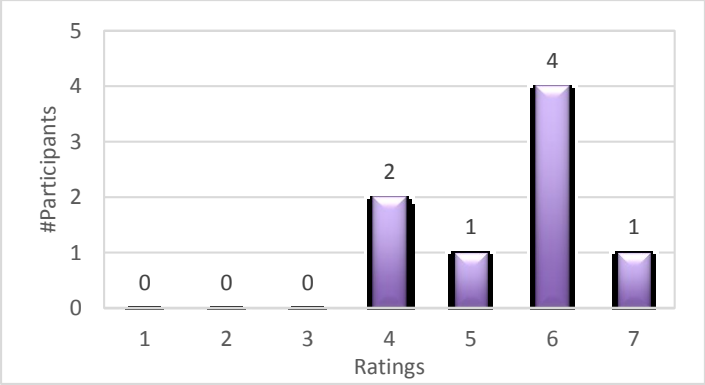



**Figure 5.24 Steps to complete a task follow a logical sequence**

**1= Too many, 7= Just right**

(f) Help messages on the screen : 1= Confusing, 7= Clear

Two participants rated this features as 5 while 2 of them rated it as 6 and 7 each. Four participants marked this feature as not Applicable since the system had few help messages and they might not have encountered any of them. The median came out to be 5.5 with the range of data lying between 5 and 7.

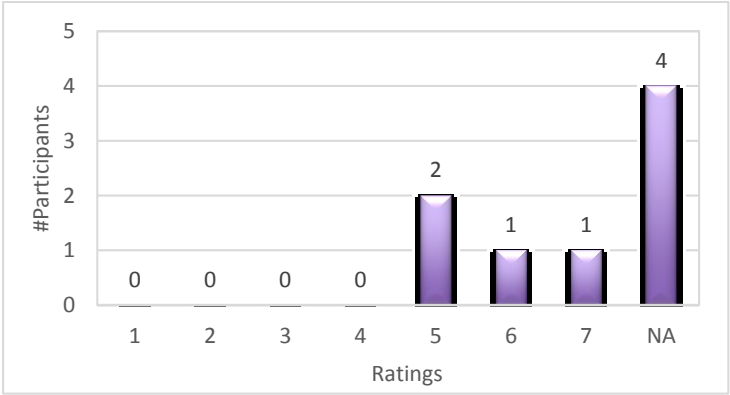



**Figure 5.25 Help messages on the screen: 1= Confusing, 7= Clear**

(g) Tutorials for beginners: 1= Confusing, 7= Clear

This feature achieved the most scattered ratings among all the features. Five out of 8 participants gave a rating of 6 to the tutorial feature while 3 participants rated it as 7, 5 and 2 respectively. The median came out to be 6 with the ratings varying from 2 to 7.

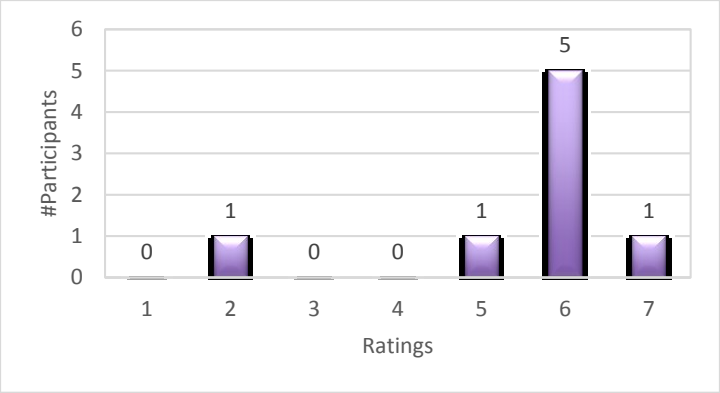



**Figure 5.26 Tutorials for beginners: 1= Confusing, 7= Clear**

### 5.3.2.5 System Capabilities

The participants were also asked to rate the systems on its performance capabilities focussing on its speed, response time for operations, rate of information display, reliability, system failures and warming about potential problems. The data obtained from the rating responses are discussed below.

(a) System speed: 1= Too slow, 7= Fast enough

Five participants assigned a rating of 6 to the system's speed while 3 of them assigned a rating of 7. The median of the data was found to be 6 with the range of rating lying between 6 and 7.

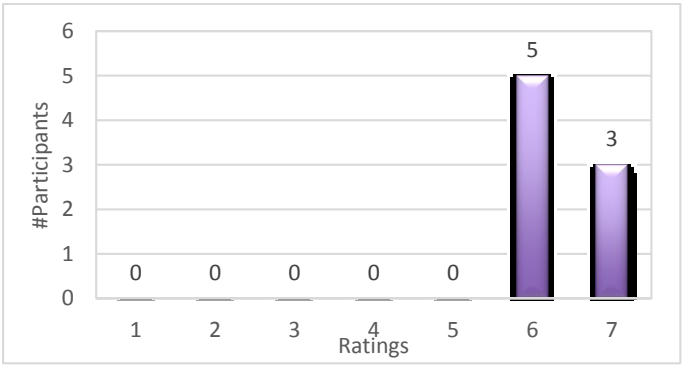



**Figure 5.27 System speed: 1= Too slow, 7= Fast enough**

(b) Response time for most operations: 1= Too slow, 7= Fast enough

Half of the participants rated the system's response time as 6 while the other half rated it as 7. The median of the data came out to be 6.5 with the range of ratings lying between 6 and 7.

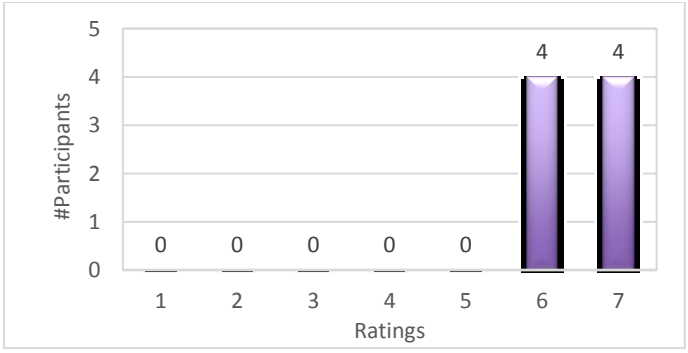



**Figure 5.28 Response time for most operations: 1= Too slow, 7= Fast enough**

(c) Rate of information display: 1= Too slow, 7= Fast enough

Half of the participants assigned a rating of 6 to the rate of information display i.e. how fast or how slow the system could display the information like the scansion marks, meter identification and other manipulations on the screen. Three participants assigned a rating of 7 while one of them assigned a rating of 5. The median of the data was found out to be 6 with the range of ratings varying from 5 to 7.

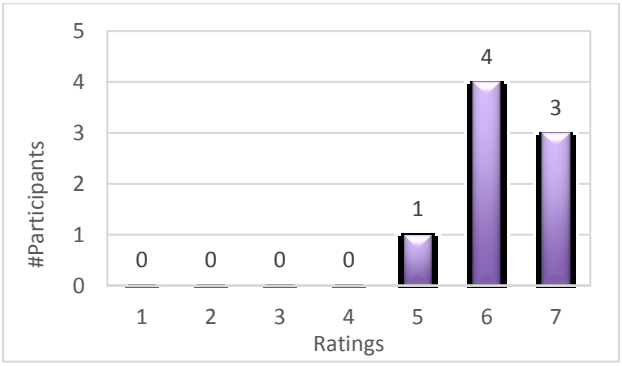



**Figure 5.29 Rate of information display: 1= Too slow, 7= Fast enough**

(d) How reliable is the system :1= Unreliable, 7= Reliable

Four participants specified that the system was reliable enough by assigning a rating of 7 to the system while 2 of them assigned a rating of 6. Another 2 participants assigned a rating of 5 to this feature. The median was calculated to be 6.5 with the range of data lying between 5 and 7.

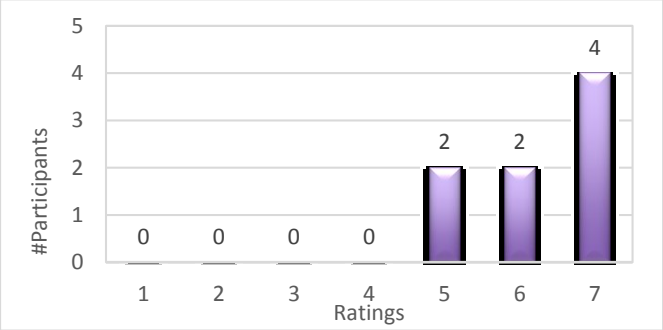



**Figure 5.30 How reliable is the system: 1= Unreliable, 7= Reliable**

(e) System failures occur: 1= Frequently, 7= Seldom

Six of the participants indicated that system failures seldom happened by assigning a 7 rating while 1 participant assigned a rating of 5. One participants also assigned a Not Applicable rating. The median of the data came out to be 7 with 5 being the lowest rating and 7 being the highest rating.

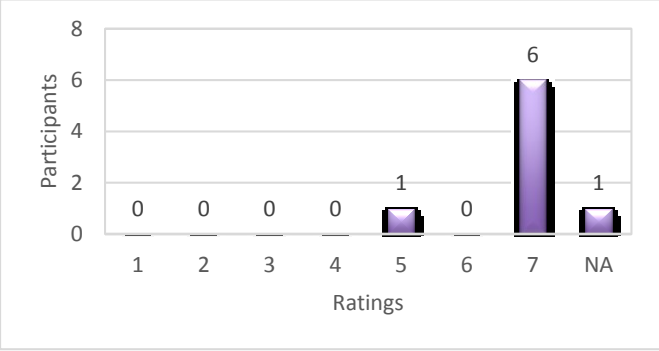



**Figure 5.31 System failures occur: 1= Frequently, 7= Seldom**

(f) Correcting your mistakes/Ability to undo: 1= Difficult, 7= Easy

Three participants rated the undo feature as 6 while 2 others rated it as 5. Another 3 participants assigned a rating of 3. The median of the data came out to be 5 with a range of ratings varying from 3 to 6.

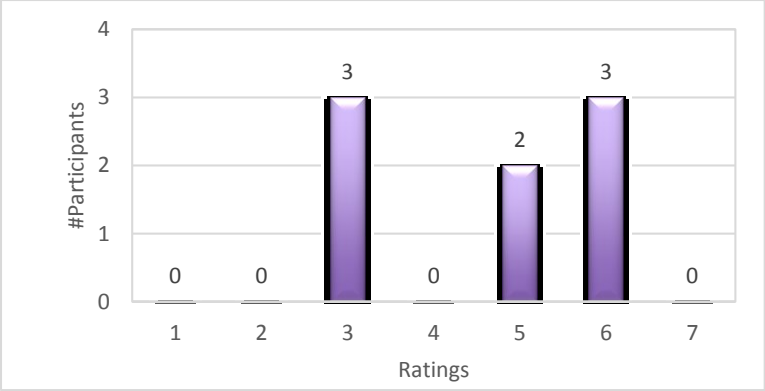



**Figure 5.32 Correcting your mistakes/Ability to undo: 1= Difficult, 7= Easy**

## 5.4 Discussion

After the participants filled out the questionnaire, the session was followed by a one-on-one discussion. During the discussion the participants expressed their experience with the system, what they liked and did not liked about the application and what other features could be added to the system. The major points that stood out in the discussion and the subjective questions in the questionnaire are elaborated in the sections that follow.

### 5.4.1 Feedback about the system's features

#### 5.4.1.1 Overall reaction:

The participants were asked about their experiences with the system as the first thing during the discussion. P1 stated "I really like it. It promotes close attention to syllable by syllable analysis and flexibility in terms of allowing variety of non-prescriptive

scansion". According to P2 "the students would find it [the system] fun. Once you get used to it, it's actually fun". P3 said "I liked the clarity and the precision of the application. In technical understanding, certainly this helps".

P4 had an elaborate impression about the system as is evident from the statement "Quite intuitive, quite easy for someone who has done scansion. It [the system] immediately makes sense. I am impressed with it. I think it's a super helpful tool. Students don't like it [scansion] doing on paper anymore. It's very irritating to them. I taught them to use [the MS] Word [Processor Software] and use accent marks, French or Swedish, but it's not good, it's not effective. I know people in my class are frustrated with that. But this [system] is a great idea. It's a lot more functional."

According to P5 "it's definitely useful to practice; at times I tell them [the students] to flip to a random book page and start scanning the poem. It seems very helpful on that. I could imagine myself using this in English1000 class". P6 said "you can eventually learn to use the system. It could be useful for people learning with a poem with relatively regular meters". P7 stated "I have used Word for doing scansion. I didn't like it at all… but this (system) is neat". P8 mentioned "I would love to use it again".

#### 5.4.1.2 Layout

The participants also had some comments about the layout and the structure of the application. P1 said "I like the color, for instance there was enough white space, and it seems to be setup well. It seems pretty intuitive as the way of using it. Wasn't at all hard to learn how to use; the way it pops up giving undo and other features, the side by side review. I really liked it". According to P3, "design of the interface was attractive, the

choice of diacritic marks was good. If it had been a bad choice, they would have stood out". P8 mentioned "I like that pop-up thing".

#### 5.4.1.3 Scansion Marks Provided by the System

On being asked if the scansion marks provided by the system were sufficient, the participants stated that the system was enough for what it is designed for i.e. undergraduate training. P1 stated "At an undergraduate level, it is simple and you don't want to have much but at a higher level we could need to incorporate all the nuances of the language. One could perhaps see someone developing a system where one could use all those nuances". P1 further added "As I was scanning certain lines, just for my own purpose, wanting to be able to note some of the nuances and obviously this [the system] didn't allow me to do that. But I wouldn't expect it … certainly it goes way beyond the purpose it [system] is intended to". P2 also had a similar idea when it was said "for sophisticated users, median stress is unavailable but for most users, this is not an issue."

But P3 was satisfied with what was provided in the system as mentioned in the comments made "the marks were sufficient and there is no need to incorporate multiple levels of stress in the terms that people who work with poetry scansion recognise that stress is only relative within the foot. It is not absolute in relation to the line as whole. Intermediate stress has a way of confusing things, so I wouldn't counsel that".

#### 5.4.1.4 Dictionary Feature

Although it was not explicitly asked to comment on the dictionary feature but the participants liked its presence in the system which is conclusive from their feedback and comments about its necessity during the scansion process. P1 stated "I think it's very

important to have it all there because most of the times students have to consult a dictionary. Just for the sake of doing it, they [the students] don't do it at all". P2's comment was noted while being used in the training session as "I think it's a great thing". P4 mentioned "I really like the dictionary feature. I like the link to OED [Oxford English Dictionary] a lot. Defining the word that you don't know is very important in this process". P5 revealed in the discussion "it's easy for them to just click anywhere and look it up. I get some ESL [English as a Second Language] students, this could be very helpful for them". P7 commented "I like that I won't need a dictionary".

#### 5.4.1.5 Terms used

It was asked in the questionnaire if the terms used in the application specific to the scansion were appropriate to which large majority of the participants agreed. P1 stated "The terms were appropriate and the marks were appropriate; all of the names like amphibrach etc., are fairly standard terms. The terms were sensible and simple enough".

#### 5.4.1.6 Getting reviews

The idea that you can compare you version with your professor's version was appreciated by almost all of the participants. P1 liked the feature as mentioned in one of the previous comments about the system. P2 stated "that's interesting and a very neat idea". P4 had a similar notion about the feature when mentioned "I like the idea of review function."

P5 thought of using the feature from a whole other perspective i.e. professor's. As stated by P5 "it's very useful. I could have one [poem] without the scanned version and have them [students] complete the scansion and then upload the correct version. I think it would be useful in preparation of exams and would eliminate a lot of work on my part

having to come up with handouts. It's much quicker to check (the accuracy of the poems scanned by the user) in here."

P4 stated that it would create a good platform for discussing different perspective which either of them [students and teachers] would not have thought of in case the two versions differ in meter.

#### 5.4.1.7 Meter Evaluation

The participants also had some feedback about the working and impact of the feature that the system identified the meter as marked by the user. P1 stated "the system did figure out the meter even if there were a lot of irregularities". According to P4, "it feels pretty natural to me, very user friendly, quite straight forward. I think it's very helpful. I like the way it tells you the variation. It would really help the students to learn meter in a much more hands on kind of way than showing [MS] PowerPoint [presentation slides]. It's much more practical." P8 stated "it's good that it tells me the meter".

On the other side, P2 commented "from the teaching point of view, I would want the students to identify the meter. Or maybe introduce it (meter display feature) at a later stage or wait until they finish scanning a poem".

#### 5.4.1.8 Importing New Poems

P5 liked the fact that you could import self-written poems as well as said in the discussion, "It [the system] could be used in a class where students are expected to write a line in a specific meter like iambic pentameter. If they have written a poem as a part of homework, they could import it and check the meter".

#### 5.4.1.9 Print

P1 liked to be able to print the poems as stated “being a person who is totally into print; I could see that there might be time when it could be handy to be able to print out and have it there. I don’t believe it exists unless it is in a hard copy because screens have a tendency to power out, screens have a tendency to disappear stuff. I print out everything obsessively”.

#### 5.4.1.10 A Touch Screen Tablet Application

It was asked in the questionnaire if they would like the application being developed for a touch screen tablet. The question got mixed responses. P1stated “yes if it were a big enough screen, not on a phone”. P2 was also excited to hear if such application was developed “yes – a great app! Probably the students would like that” and p4 also wanted to see some kind of tablet application for this tool. P8 stated “that would be really cool!”. The idea however was not liked by P3, P5 and P6. P5 stated “I’ll not particularly prefer it. It could be more difficult to select the words”.

#### 5.4.1.11 Features Not liked

The participants also commented where the system lacked in terms of functionality. Additionally, they also mentioned the difficulties they faced while using the application. P1 said “The only thing difficult was doing the undo and highlighting. There were times when I went too fast and the whole thing went blue; I don’t know if it’s the screen or my own ability of being able to be able to use the mouse”. P2 had difficulty in putting the feet mark. P2 stated “everything is neat; the only thing is division into feet. It’s a little clunky. If somehow it could be done upfront”. P3 also faced some problems with the

undo “undo was not much flexible, I would say a bit frustrating”. P5 had some difficulty in fine selection of the text as mentioned in the comments “I didn’t like the pickiness in selection. Once you know it, it’s easy but I think you have to tell them the first time. Other than selection, it’s easy to use”. P6 thought the system was difficult to learn, “I would say a steep learning curve for people who do not know how to scan, learning the steps and getting them right could be difficult.”

### 5.4.2 Other functionality Needed

The participants also contributed to the ideas that could be incorporated into the application in the versions to come. The ideas included the featured that should be present version and some fantastic ideas that would enhance the learning experience.

#### 5.4.2.1 Incomplete Feet

The system lacked in the terms that it could not identify the presence of incomplete feet. P4 stated “that’s one of the things that students finds petty confusing, those incomplete feet and things like that. If you were working with someone like Dickinson, where she does do a lot, that would actually be really helpful to have that function to reassure the students that were not wrong”. P5 also mentioned “it didn’t have the ability to identify incomplete feet” while P3 said “there could be a mark for missing syllable”.

#### 5.4.2.2 Annotation

It was asked in the questionnaire if they would like the feature of annotation to be added to the system, the participants agreed to the idea. P1 mentioned “I actually make my students to do annotation activity in class, where they just sit in group’s, one person writes something and passes it on to the next and when the poem comes back to the first

person there are not just additional ideas to what he thought but answers to some questions he might have written. So it's great for them learn. I would definitely say yes to an annotation feature". Agreeing to what P1 thought, P2 said "scansion is very important in understanding poetry but this [system] is the first step. Students have to figure out the significance of the scansion. What my goal is to guide them to see 'okay! There is variation in the in a line but what does it do to the line, what does it mean". It would be really cool to be able to annotate and comment if a foot is trochaic what does the do to the line".

P4 seemed to have a similar notion about the question when it was stated "the annotation function is a very good idea. A lot of assignments which would have scansion would also have some kind of annotation. So I think that's really good". P5 also stated "I think it's definitely useful, for sure it could be helpful in taking notes in class.

P7 commented "I take notes on my laptop but if you have it there that's even better".

#### 5.4.2.3 The Way Some Standard Words are Scanned

There were suggestions about incorporating a feature where the system could alert the users if they tried to scan a standard word in a different. P1 stated "I thought it would be useful to have some way of alerting the students to the fact the some words have to be scanned in a particular way like garden. It has to be "GARden" and not "garDEN". The accent has to go right". P2 said "if they [the students] could sometimes hear, what a more conventional word with a regular meter would sound like, it would be good."

#### 5.4.2.4 Oral Component

Many participants suggested that a component could be included where the users could hear the poems as well. P1 elaborated on the need of the features as “there is necessity of a voice function so that the students have to speak the poem several times, naturally, and allow them to hear their own voice so that they can start to hear rises and falls, pauses and emphasis, before they start scansion. After they have finished a line, a voice reading it back in the way they scanned it rather than they think they might have scanned it because students really need ear training. This seems to be an ideal way to incorporate that.”

P2 also added to the idea through the comment “an audio component could be added maybe people reading the poem, not in a mechanical way to overemphasize the stress, but perhaps actual people reading it. Sometimes a very good reader is also a pleasure to listen to”.

For the better explanation of the relation between scansion and the sound we hear, P3 suggested something similar when it was mentioned “I do spend a lot of time on oral performance and I love reading poetry myself. If I am teaching a course, all of my students would perform at some point of the course. If students read poem, they’ll be more confident in going into this (scansion) exercise.”

#### 5.4.2.5 Visualization of Meter

An interesting idea that could be worth tying in future versions could be the visualization of the stresses in a line. P1 said “some way to visually graph the places where the voices go higher and lower so the students could see the ups and downs of their voices; anything

that can get people talking and thinking about what a wonderful instrument the voice is and how that an important part of the language that has been neglected because we tend to read with our eyes too much and we don't read with our body enough; anything that we can use the digital medium to be able to bring out that element , I think it's terrific".

#### 5.4.2.6 Introductory Lecture

The system was developed taking into consideration that the students will learn about scansion in class and then would use this tool for practising. However, it was mentioned in the discussion that some of the users might want to take another look at scansions before going into practising and we cannot presume that they have learnt about scansion. To eliminate this presumption, P2 suggested that "an introductory lecture could be added". The idea was supported by P5 in the comment "a lesson page with some examples of meter could be there".

#### 5.4.2.7 Chat

The idea of presence of a chat functionality was discussed by most of the participants where the students could discuss the reasons why they scanned a line in a particular way or just some thoughts about the poem with professors and other users. P4 stated "the idea that you could have a dialog with the professor is great. On one hand there is a right and wrong, on the other hand there are different interpretations (in terms of scansion). Like, some people see Shakespeare, at times, very regular and at times irregular. It's good to see a chat kind of feature"

#### 5.4.2.8 Linking with Existing E-learning Software's

Since the E-learning software's are being used by the professors currently to manage the courses and course material, it was suggested by some of them to be able to link the application with the E-learning applications they are using so that they could centralize the course work. P2 stated "BBLearn [BlackBoard Learn] access could be provided". P4 also suggest a similar idea "Some sort of Link to BBLearn could be there. You could upload all the poems you are going to look in the class, have a little database sorted into categories. I think it would be really interesting."

#### 5.4.2.9 Miscellaneous

Some of the other features that were suggested by the participants that could be incorporated in the versions of scansion tool to come have been listed below:

- P3 felt "the system lacked the ability to deal with anomalous feet and feminine endings"
- P5 and P6 wanted to include the functionality like caesura which is a midline pause.
- P5 suggested that there could be an "option to send the scanned poems to the professor."
- P6 recommended "there could be more intuitive functionality like restart a line."

The following table concludes the comments given by the participants for the different features. The number of comments (positive or negative) mentioned in the table includes only the explicitly mentioned comments.

| # | Feature | #Positive Comments* | #Negative Comments* | Discussed in Section |
|---|---|---|---|---|
| 1. | Flexibility in selecting syllable | 1 | 0 | Section 5.4.1.1 |
| 2. | Pop-up toolbar | 2 | 0 | Section 5.4.1.2 |
| 3. | Meter evaluation | 3 | 1 (wanted to give control to the teacher to allow this) | Section 5.4.1.7 |
| 4. | Getting Reviews | 4 | 0 | Sections 5.4.1.2, 5.4.1.6 |
| 5. | Choice of scansion marks | 1 | 0 | Sections 5.4.1.2 5.4.1.3 |
| 6. | Undo | 0 | 2 ( More number of steps than expected) | Section 5.4.1.11 |
| 7. | Putting scansion marks | 0 | 1 ( More number of steps than expected for "/") | Section 5.4.1.11 |
| 8. | Selecting the syllables | 0 | 2 (trouble with fine selection) | Section 5.4.1.11 |
| 9. | Dictionary | 5 | 0 | Section 5.4.1.4 |
| 10. | Layout of elements | 2 | 0 | Sections 5.4.1.2, 5.4.1.3 |
| 11. | Importing new poem | 1 | 0 | Section 5.4.1 |

**Table 5.1 Summary of Comments about the Features**

*number includes only the comments/issues explicitly mentioned by the participants

### 5.4.3 Other Suggestions

Some other suggestions were also shared by the participants at times during the discussion sessions which are mentioned below.

1. P5 wanted to see the glossary sorted “in groups like different type of feet and line length”.
2. P6 wanted to have all the basic functionality, like print, save and add new poem, in a tool bar over the top of the workspace.
3. P6 also suggested an automatic scansion features where “For simpler poems, the user finishes a couple of lines, the program identifies the line and then the user says do the rest of the lines and I’ll put the variations instead of having to do each line which becomes a chore after a while”. Something similar was suggested by P5 as well.
4. P6 wanted to be able to search for poems from the within the system to import them as said “you might think about tying to online repository, search the poems from there and import”
5. P6 also raised a concern about importing the copyright material into the system. He suggested that there could be some controlling body to check the copyright issues before the users import a poem.
6. P2 stated “There could be an application for the actors because they have to be very careful of the diction and stress”.
7. P4 said that the system might also be designed to have “ability to deal with meters in non-English poetry. A lot of scansion is going on in the Classics department. They do a lot of Latin and Greek poetry. So they are the people who might also be interested in scansion”.

The following table summarises the suggestions given by the participants towards improving the application.

| Suggestion # | Suggestion | Possible solution in Section |
|---|---|---|
| 1. | Ability to deal with poetical features like incomplete feet, anomalous feet, caesura and feminine ending | Section 6.1.1 |
| 2. | Oral Component for hearing poems | Section 6.1.5 |
| 3. | Visualization of meter | Section 6.1.10 |
| 4. | Annotation feature | Section 6.1.4 |
| 5. | Introductory lecture on scansion for beginners | Section 6.1.2 |
| 6. | Chat functionality | Section 6.1.6 |
| 7. | Links to existing e-learning applications. | Section 6.1.7 |
| 8. | Links to poem repositories for easy import | Section 6.1.9 |
| 9. | Development of similar application for tablets | Section 6.1.11 |
| 10. | Ability to restart scanning single lines | Section 6.1.1 |
| 11. | Error messages when scanning a standard word differently | Section 6.1.5 |
| 12. | Automatic scansion for poems with relatively regular meter | Section 6.1.8 |

**Table 5.2 Summary of Suggestions**

Concluding the discussion sessions, participants were asked if they would continue to work on the system even after the study. The responses were enthusiastic from almost all of the participants. P1 stated "I would like to use it in teaching ASAP [As soon as possible] – plus this is directly related to my scholarly research. It has great potential. I would use it and let fellow scholars and teachers know about it". P2 had the same answer

to the question “yes, because students struggle with scansion and this could help”. P3 was a little apprehensive about using it when it was said “Perhaps not. I am still addicted to paper. I think my students and students in future, will find it extremely useful”.

## 5.5 Revisiting Research Questions

From the user’s responses towards the application through user satisfaction rating and one-on-one discussion, we now try to find the answers and explanations to the research questions behind conducting the whole user evaluation.

### 5.5.1 Research Objective 1: To determine if the system performs the scansion task in the way the stakeholders (teachers) want.

As discussed in Chapter 3, we gathered the design requirements through interviews with the stakeholders of the project. The first objective was to investigate if the system allows the users to perform the scansion task as required and as they normally do on paper. To see if this objective has been achieved, we need to examine various aspects of the application involving choice of scansion marks, flexibility in choosing the syllables, steps involved in scanning, and ability to correct mistakes as discussed below.

#### 5.5.1.1 Choice of Scansion Marks

From the comments given by the participants (See Section 5.4.1.3), it is evident that the marks provided in the application are sufficient for scansion training, however for more sophisticated users, there could be more symbols representing multiple stress levels. There were certain users who used different scansion symbol(s) than the ones provided in the application. Although these users got adapted to the symbols given in the system, the

system could be made more flexible by giving the users an option to choose the scansion marks as they prefer.

#### 5.5.1.2 Flexibility in choosing the syllable

As discussed in Chapter 2, there are certain words that could be interpreted as having different number of syllables depending upon the situation e.g. the word “paradise” which could be taken as two syllable word as “para-dise” or “par-a-dise”, there was a need of an application that provided the freedom in choosing the syllables to its users. With this application an attempt was made to provide such a flexibility. From the user’s comments in Section 5.4.1.1, we can say that this feature was liked by the participants.

#### 5.4.1.3 Steps involved in scansion

Since this was the first application participants were performing scansion on, they felt that some putting some scansion marks like the foot mark and doing the undo operation involved more steps than they expected as is evident from their comments (See Section 5.4.1.11) and the graphs (Figures 5.23 and 5.33). This could probably be due to the fact that the users had been doing scansion on paper prior to using the application where it is pretty straightforward to scan but doing the same the same on a browser involves fine selection. The possible solution to reducing the steps in putting a foot mark could be by simply clicking on the screen between the words or syllables for the foot mark to appear. However, the other scansion marks cannot not be simplified further to the best of researcher’s knowledge. A possible solution to undoing a scansion could be that a click on scansion mark would remove the scansion mark from the syllable. Another possible alternative to undo is discussed in Chapter 6 (See Section 6.1.1 Scansion Features). So

we can conclude that the application could have lesser number of steps in terms of scanning the poem.

From the discussion above we can safely conclude that the participants found the system to be working in the way scansions are done and the way they would like although some steps involved in scansion could be simplified. Thus we can say that this objective has been achieved to a certain extent.

### 5.5.2 Objective 2: To determine if the system is easy to learn and easy to use.

From the data collected in the learning section in the user satisfaction rating (Figures 5.20 to 5.26), we can conclude that the users found the system easy to learn and operate. It was also observed during the training session that the participants were able to learn to operate most of function the first time. The only exception was learning to perform the undo and putting foot mark where it took them more time to learn the steps.

### 5.5.3 Objective 3: To determine to what extent the additional features provided by the system are useful.

The additional features added in the system included automatic meter identification, the review functionality to compare the scanned poems for accuracy and the dictionary feature (See Sections 4.1.3, 4.1.4, and 4.1.6). From the participant's comments about these functionalities (Sections 5.4.1.4, 5.4.1.6, and, 5.4.1.7), it can be safely concluded that these features are not only appreciated in the application but are useful as well.

A different perspective that came out in discussion about the review functionality was that this feature could be helpful for both students and teachers. During the development phase of the application, the researcher thought that the review feature could be helpful to the students in knowing where they differ from the professor's perspective. However, a participant commented that it could useful to her while she is marking exam copies and would save much of her time.

### 5.5.4 Objective 4: To gather qualitative feedback towards the system to understand what features are liked and what features need to be improved.

The most significant things in the system, we wanted to get reviews about from the participants were:

- The reactions towards the application
- The screen elements
- The terminology used in the system
- Its learnability, and
- The system capabilities.

These are the elements which are necessary to provide a completeness to the application from multiple perspectives. Even though some of the aspects are not directly related to the scansion task it was mandatory to ask the users where the application stood as a whole system.

The results of the user satisfaction ratings, were as expected. The participants found the system fast enough, reliable, responsive, easy to learn, consistent, and their experience

with the application was satisfying and stimulating. We can safely conclude that the participants liked the features of the application except the undo functionality. It was observed during the training session that some of the participants struggled with learning how to use the undo operation. They also mentioned this problem during the discussion session that the undo functionality could be made simpler. A possible solution to this problem is discussed in the following Chapter (See Section 6.1.1).

## 5.5 Limitations of the Study

We have two distinct user groups (students of poetry and teachers of poetry) for this application. However, we evaluated the application with only one user group i.e. teachers of poetry (and Teaching Assistants). To understand if the system performs according to what students would want, this application should also be evaluated with the student group.

We did not ask the participants specific questions during the post-practice session and relied only on the participant responses to the general open-ended questions. Consequently, they did not explicitly mentioned their view-point on certain features even if they had thought about it while performing scansion during practice session.

## 5.6 Summary

In this chapter, we discussed the process of evaluation of the online scansion tool. The initial parts of the chapter discuss the motives behind conducting the study along with the detailed study design which was followed by the results from the user satisfaction questionnaire. It was evident from the data analysis that the features of the application were liked by the users. There were a few lower ratings for the number of steps involved

in the operations and undo feature. This probably could be due to the fact that the participants were doing scansion tasks on paper before this application where is it naturally very easy to put marks.

From the feedback provided by the participants in the discussion section, we can safely conclude that the system performs in the way it is supposed to. We also tried to answer the other research questions. The features that could be added to the system are listed in the future work section in the chapter that follows.

# CHAPTER 6 FUTURE WORK AND CONCLUSION

In this chapter, we list the future work that could be considered adding to the future versions of the online scansion tool. The section is followed by the conclusion section listing the major contributions of this thesis.

## 6.1 FUTURE WORK

As is evident from the discussion in the previous chapter, the system provides features that are liked by the prospective users of the tool but there were many suggestions that could be interesting and useful to the users.

### 6.1.1 Scansion Features

It was witnessed from the results of the field evaluation of the application that the systems required some features that should be included to make the scansion more refined. These features have been listed below. First three of them should be taken into account in the immediate version of the application that follows.

1. Include ability to mark Incomplete Feet, Feminine Ending, Mid-line pauses

It was observed that some of the participants marked incomplete feet in some of the lines in addition to feminine endings. Some lines also required the insertion of caesura. The current system is not designed to take into consideration such features but should be the first preference of someone working on the extension of this tool.

2. Allow easier Undo functionality

Currently, the system requires selection of syllable(s) to undo marking. The participants found this feature a little cumbersome to use perhaps due to the difficulty in selection or remembering the action. In the later versions, a standard undo feature which could manage some or all the previous states of the poem from the beginning of the session could be used to go to the previous or next steps. Additionally to remove a mark from an entire line, small legends could be provided in the left margins of the poetry lines which would reload the line on clicking.

3. Allow easier division into feet

As the participants were used to performing scansion on paper, where they could simply put a foot mark anywhere in the line, some of them had difficulty in remembering that they had to select all the syllables under one foot to put the mark. It would be interesting to know how just a click between the words of the line could be interpreted correctly for the location of the foot symbol.

4. Include availability of elision, enjambment and concordance features

Enjambment refers to "the practice of setting metrical units and grammatical units at variance, with the result that the reader must read through the line ending in order to determine the sense of phrase or clause" (Steele, 1999).

Elision is "the contraction of two syllables into one for metrical purposes" (Steele, 1999) which may include different scenarios:

- Contraction of two vowels sitting side by side within a word e.g., “tumultuous” treated as “tu/mul/chwus” instead of “tu/mul/choo/us”.
- Contraction of two vowels facing each other across a gap between words e.g., The expense taken as Th’expense.
- Omission of a vowel, consonant, or a syllable from a word e.g., considerate taken as consid’rate or belonging taken as ’longing.

Concordance is an alphabetic collection all the words that appear in a poets work along with the citation of the work in which that word appears. Concordances makes it easy to locate a work even if a user recalls a few words of the poem. It might also help the users identify a poem through the phrases that appear in that poem by linking those phrases with other poems from the same poet.

As required by the participants in the requirement gathering process (See Sections 3.3.8.9, 3.3.8.11) and mentioned by the participants in Section 5.4.2, these features could be taken into consideration in the future versions of the application to come.

5. Allow users to customize scansion marks

It was also noted that few of the participants used different symbols for marking the stressed and unstressed syllables than the ones used in the system. Although they got adapted to the marks used by the system in a short time but the later versions could be designed to consider user preferences for such marks. The system could ask the user what marks they would prefer to be used for marking out of the ones available when the login into the system for the first time. While this customization would require changes in the

structure of components like the pop-up toolbar and the meter identification algorithm from static to dynamic, it would be interesting to see if such feature is preferred by users.

6. Allow the users to mark intermediate stress

If the tool is extended to be used by sophisticated users, multiple levels of stress might be included. It would be interesting to know how the system interprets them to display the meter in the line.

7. Include the ability to restart scanning a line

It was observed during the training session that some participants made a lot of changes to the scanned lines before moving over to the next lines. To prevent the user from doing multiple undo operations over the same line, an option could be provided to users wherein they can remove all scansion marks from a particular line and start with a fresh and unscanned version of that line.

8. Include the feature of color blocking the stanzas

As discussed in section 3.3.8.3, color blocking the stanzas would help the users in identifying the type of poem which might help them in identify the meter thereafter. So, a feature where the system presents the poem with a different background color to each stanza could be worth trying in the future versions of the application.

9. Include line numbers for easier navigation

It was mentioned during the requirement gathering phase (3.3.8.14) that line numbers could be provided alongside the lines of the poem so that it is easier for the users to navigate through longer poems. As a solution the users could be provided numbering with the lines with an option to turn the line numbering on or off whenever they wish to

and be able to jump to a specific line if they do not want to scroll over all the previous lines.

10. Include system's ability to ask poem specific questions

As discussed in section 3.3.8.7, an interesting feature could be the an option where the system could ask poem specific questions e.g., if a user has marked a line as iambic pentameter and the rhyme scheme follows *abbaabba cdecde* , the system could ask the users if they think the poem is a sonnet.

The system could ask the professor to fill in the questions that could arise in context of a particular poem or fill in the general conditions required for such questions to come up and let the system identify the presence of those conditions in the poem and ask them at appropriate time.

### 6.1.2 User Training Engine

It was also observed that the user training is mandatory before starting to use the application. To solve this problem, a user training engine could be included in the application the first time the user logs in. A similar idea is being deployed by some of the tablet applications to train their users. The proposed feature would allow them to practice the fine selections and help them in remembering the steps in an interactive manner until the time they get it right without any assistance.

Additionally, an interactive tutorial on the basics of scansion could also be made available which could help the students learn about the details of metrical analysis of poems through

### 6.1.3 Interface for Professors

For the purpose of testing the application, the database in the application was built by the researcher herself. For the application to be used in real life, the interface for the professors needs to be developed to directly add poems that needs to be done by the user, create their scanned copies and make them available to the students as and when chosen by the professor. Other features could include creation of dictionary for the words with standard accent, grading and commenting on the submitted scanned poems, communication with the students, managing the course material among other features.

### 6.1.4 Annotation Feature

Both in the requirement gathering process and the field evaluation of the application, the participants said that an annotation feature would be a great help. Although third-party plugins for annotating web pages are available but these tools work on an image of the webpage to be annotated on their own website and saves them on their own server or user's local machine. If an annotation feature is to be provided, it has to be specifically designed keeping in mind the scansion application.

An interesting way to provide this feature could be that users are able to put notes anywhere on the workspace and would have the option to view the scanned and annotated poems overlaid like layers with transparent backgrounds or separately if they wish to, be able to save and print them in all possible combinations.

### 6.1.5 Oral Component

The participants suggested that there could be a component in the tool where users could hear the poem being read so that users can actually listen to variations in the pitch of

voice before they start scanning. As a primitive solution the professors could be provided an option to record their own voice while they recite the poems and the students could hear this recording before they start scanning the poem. Alternately, the recording could be associated with each line of the poem so that if the students wish, they could hear it over as many times they like for the assistance.

There could be dictionary of some words that occur in poems in the database that have a standard accent. If the students try to scan it in some other way, they could be alerted of their action rather than an error. The option to create this dictionary could be given to the professors at the time they build the database asking them to fill in the word with its accent.

### 6.1.6 Chat/forum functionality

This functionality could be added in the future versions which would allow the users to communicate. The ability to share scanned poems, with or without annotations could also be included within the functionality to support and promote collaborative learning.

### 6.1.7 Collaboration with Existing E-learning Tools

The system could be extended as an add-on to the existing E-learning tools which provide easy data management, sharing information, submitting homework, posting comments and grading among other features. Such a collaboration could reduce the effort on future developer's part not having to build standard functionality especially for the system and reusing the existing functionality of those tools.

### 6.1.8 Automatic Scansion

An idea where the system could mark the poetry lines based on the meter of some of the initial lines would be an interesting feature that the future versions could have. Furthermore, it would be fascinating to see how the words would be broken into syllables automatically by the system. A dictionary of words with their syllabic description would be needed for this function to work appropriately.

### 6.1.9 Links to Online Repositories

One of the important features that the future researchers could look into is the collaboration with the reputed online repositories such as the Representative Poetry Online[3]. The users could search for a poem from within the scansion application and directly import it. The system would need the knowledge of the structure of the repository so as to import the correct text.

### 6.1.10 Visualization of Meter

A stimulating feature that could be included in the later versions of the application could be the presence of a meter visualization feature which could somehow present the rise and fall of the stress on the different syllables as users have marked so that they could think and understand how their scansion feels to the ears (See section 5.4.2.5).

### 6.1.11 Application for Touch Screen Laptops or Tablets

Another interesting aspect to be looked for would be the development of a similar application for touch screen laptops or tablets. A stylus could be used for selection and

[3] http://rpo.library.utoronto.ca/

other interactions requiring precision. It would also be interesting to see someone coming up with some other innovative technique for the selection of the syllables.

### 6.1.12 Browser support

Currently, the application works for Google Chrome and Safari browsers but has difficulty with other browsers due to the way these browsers render the ruby tags which are used to display the poems. For the future versions, the system could be extended in a way that it is compatible with most the browsers in addition to the facility that the browsers render these ruby tags in one standard way.

## 6.2 CONTRIBUTIONS

In this section, we revisit the contributions as presented in the introduction of the thesis. The work on the application began with the literature survey on the details of scansion, how it is done, what variations occur and what these variations mean.

This was followed by a requirement gathering process where semi-structured interviews were conducted with one of the prospective user group of the application i.e. poetry teachers to understand their expectations from the application and set of features was chosen from those requirements to be included in the first version of the application (See Table 3.1).

A major contribution of the thesis is towards the design and development of novel online scansion tool where the students could practice scansion. The tool provides flexibility in terms that the user has control over the syllabic divisions since there is always scope of interpretation in literature. Basic file management functionality was provided in addition to some innovative ideas creating a tool that provides a complete learning environment.

The tool was then evaluated in a field study where the user group of poetry teachers was given the system to use before and then their feedback was taken in form of qualitative question and subjective questions in addition to the discussion about the application and its feature. From the results of the study, it was evident that the users appreciated the application and would like to use in real life as well.

The thesis concluded with presentation of some areas where further work is mandatory in addition to various ideas which could be included in the versions to come. With the incorporation of these features, the application would definitely evolve to become a feature rich tool that could be helpful in learning about scansion in an interactive way.

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# APPENDIX A: RESEARCH ETHICS BOARD APPROVAL LETTER- REQUIREMENT GATHERING STUDY


**Social Sciences & Humanities Research Ethics Board**
**Letter of Approval**

November 22, 2012

Ms Megha Jyoti
Computer Science

Dear Megha,

**REB #:** 2012-2847
**Project Title:** NUScholar

**Effective Date:** November 22, 2012
**Expiry Date:** November 22, 2013

The Social Sciences & Humanities Research Ethics Board has reviewed your application for research involving humans and found the proposed research to be in accordance with the Tri-Council Policy Statement on *Ethical Conduct for Research Involving Humans.* This approval will be in effect for 12 months as indicated above. This approval is subject to the conditions listed below which constitute your on-going responsibilities with respect to the ethical conduct of this research.

Sincerely,
Dr. Sophie Jacques, Chair

## APPENDIX B: SEMI-STRUCTURED INTERVIEW QUESTIONS-REQUIREMENT GATHERING STUDY

1. What scansion marks are usually required by the students while marking-up a poem?
2. How would you prefer the scansion marks to appear while being used by the user for mark-up?
3. How should the poem appear on the screen to the user?
4. While saving the poem, how would you prefer to store the different versions of marked-up poem? Should the user be able to save incompletely marked-up poems to be completed at a later time? If yes, should a current copy replace the previous copy of the marked-up poem?
5. How would you prefer to check the accuracy of the mark-ups by the user? Should it be done line by line as the marking is being done or once the poem has been completed for mark-up task?
6. What additional features are required / expected from the system?
7. What should the user be allowed to do in addition to the mark-up of the poem?
8. If a glossary needs to be provided to the user, how should it be made available to the user?
9. If the tool is required to provide the feature of annotating the poem, how would you prefer the annotations to be shown to the user in terms of its placement on the user screen?
10. Is the system under consideration a web application or a desktop application?
11. How would you prefer the user screen to appear when logged in? How would the user be able to select the poem to be marked up? Should it be an assigned task or user choice task?

12. What should be the grading scheme, if any, to score the correct mark-ups?

13. How would you prefer to add new poems to the system?

## APPENDIX C: RESEARCH ETHICS BOARD APPROVAL LETTER-

## FIELD EVALUATION STUDY


**Social Sciences & Humanities Research Ethics Board**
**Letter of Approval**

June 28, 2013

Ms Megha Jyoti
Computer Science\Computer Science

Dear Megha,

**REB #:** 2013-2983
**Project Title:** Assessing Poetry Markup with NUScholar

**Effective Date:** June 28, 2013
**Expiry Date:** June 28, 2014

The Social Sciences & Humanities Research Ethics Board has reviewed your application for research involving humans and found the proposed research to be in accordance with the Tri-Council Policy Statement on *Ethical Conduct for Research Involving Humans.* This approval will be in effect for 12 months as indicated above. This approval is subject to the conditions listed below which constitute your on-going responsibilities with respect to the ethical conduct of this research.

Sincerely,

Dr. Sophie Jacques, Chair

## APPENDIX D: RESEARCH ETHICS BOARD AMMENDMENT

## APPROVAL LETTER- FIELD EVALUATION STUDY


**Social Sciences & Humanities Research Ethics Board**
**Amendment Approval**

August 02, 2013

Ms Megha Jyoti
Computer Science\Computer Science

Dear Megha,

**REB #:** 2013-2983
**Project Title:** Assessing Poetry Markup with NUScholar

The Social Sciences & Humanities Research Ethics Board has reviewed your amendment request and has approved this amendment request effective today, August 02, 2013.

Sincerely,

Dr. Sophie Jacques, Chair

# APPENDIX E: QUESTIONNAIRE – FIELD EVALUATION STUDY

**Part 1**

For the following questions, please circle the numbers which most appropriately reflect your impression about using this system. NA=Not Applicable

**1. Overall reactions to the system**

| | | | |
|---|---|---|---|
| 1.1 | Overall reactions to the system | Terrible ... Wonderful | NA |
| | | 1 2 3 4 5 6 7 | |
| | | Frustrating ... Satisfying | NA |
| | | 1 2 3 4 5 6 7 | |
| | | Dull ... Stimulating | NA |
| | | 1 2 3 4 5 6 7 | |
| | | Difficult ... Easy | NA |
| | | 1 2 3 4 5 6 7 | |
| | | Rigid ... Flexible | NA |
| | | 1 2 3 4 5 6 7 | |

**2. Screen**

| | | | |
|---|---|---|---|
| 2.1 | Characters on the computer screen | Hard to read ... Easy to read | NA |
| | | 1 2 3 4 5 6 7 | |
| 2.2 | Was the highlighting on the screen helpful? | Not at all ... Very much | NA |
| | | 1 2 3 4 5 6 7 | |
| 2.3 | Were the screen layouts helpful? | Never ... Always | NA |
| | | 1 2 3 4 5 6 7 | |
| 2.3.1 | Amount of information that can be displayed on screen | Adequate ... Inadequate | NA |
| | | 1 2 3 4 5 6 7 | |
| 2.3.2 | Arrangement of information on screen | Illogical ... Logical | NA |
| | | 1 2 3 4 5 6 7 | |
| 2.4 | Sequence of screens | Confusing ... Clear | NA |
| | | 1 2 3 4 5 6 7 | |

**3. Terminology and System Information**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 3.1 | Use of terms throughout the system | Inconsistent | | | | | | Consistent | NA |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| 3.2 | Does the terminology relate well to the work you are doing? | Unrelated | | | | | | Well related | NA |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| 3.3 | Messages which appear on the screen | Inconsistent | | | | | | Consistent | NA |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| 3.4 | Messages which appear on the screen | Confusing | | | | | | Clear | NA |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| 3.5 | Does the system keep you informed about what it is doing? | Never | | | | | | Always | NA |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| 3.6 | Error messages | Unhelpful | | | | | | Helpful | NA |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |

**4. Learning**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 4.1 | Learning to operate the system | Difficult | | | | | | Easy | NA |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| 4.2 | Exploration of the features by trial and error | Discouraging | | | | | | Encouraging | NA |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| 4.3 | Can tasks be performed in a straight-forward manner? | Never | | | | | | Always | NA |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| 4.3.1 | Number of steps per task (e.g. marking a syllable, undo marking, etc.) | Too many | | | | | | Just right | NA |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| 4.3.2 | Steps to complete a task follow a logical sequence | Too many | | | | | | Just right | NA |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| 4.4 | Help messages on the screen | Confusing | | | | | | Clear | NA |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| 4.5 | Tutorials for beginners | Confusing | | | | | | Clear | NA |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |

**5. System Capabilities**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 5.1 | System speed | Too slow | | | | | | Fast enough | NA |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| 5.1.1 | Response time for most operations | Too slow | | | | | | Fast enough | NA |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| 5.1.2 | Rate of information display | Too slow | | | | | | Fast enough | NA |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| 5.2 | How reliable is the system | Unreliable | | | | | | Reliable | NA |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| 5.2.1 | System failures occur | Frequently | | | | | | Seldom | NA |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| 5.3 | Correcting your mistakes/Ability to undo | Difficult | | | | | | Easy | NA |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |

**Part 2**

1. How often do you scan poems?

a) Very frequently (many times a week)

b) Frequently (few times every week)

c) Occasionally (few times a month)

d) Very Rarely

2. How long have you worked on this system?

A) Less than an hour

B) 1 hour to less than 3 hours

C) 3 hours to less than 5 hours

C) More than 5 hours

3. Does the system perform the tasks as required/expected?

___ Yes

___No

If no, what functionality do you think what lacking in the system?

_____

_____

_____

_____

4. What features of the system did you like the most?

_____

_____

_____

_____

5. What features of the system did you not like?

_____

_____

_____

_____

6. Do you think this system has assisted you in the analysis of poetry? Why or why not?

_____

_____

_____

7. Are the scansion marks provided in the system sufficient for you to scan the poems? If not, which other marks would you like to be included?

_____

_____

_____

8. Would you like the annotation feature for adding personal comments to be included in the system?

_____
_____

9. Would you continue using the system even after the completion of the study? Why or why not?

_____
_____
_____

10. Would you use/prefer to use this system if it was provided on a touch –screen tablet?

_____
_____

11. What other features would you like to be added to the system?

_____
_____
_____
_____

12. Any other comments you have about the system.

_____
_____
_____