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## Assessing the Assessment: Rubrics Training for Pre-service and New In-service Teachers

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Recent studies report that the use of rubrics may not improve the reliability of assessment if raters are not well trained on how to design and employ them effectively. The intent of this two-phase study was to test if training pre-service and new in-service teachers in the construction, use, and evaluation of rubrics would improve the reliability of their evaluations of writing assignments. Results of Phase 1 showed that raters were significantly influenced by mechanical characteristics of students' writing, and that using rubrics may not improve the reliability of assessment attributes if raters are not well trained on how to design and employ them effectively. Researchers asserted that without high quality, intense training, participants (N=355) who use rubrics to assess students' writing are usually just as subjective in their evaluative marks as those who do not use rubrics. In Phase 2, participants (N=55) received intense rubrics training prior to being presented with the two writing samples. Results of Phase 2 showed that rubrics training led to more reliable assessment of both writing samples.

Rubrics, defined as scoring tools that lay out the specific expectations for assignments (Stevens & Levi, 2005), have been developed and used by school systems and teachers for decades in attempts to streamline, clarify, and synthesize evaluative measures. These assessment instruments have been the subject of considerable study during this time, and much has been written on their effectiveness relating to the assessment of students' writing. Many existing studies; however, have been limited to the field of English composition, and have been descriptive or argumentative in nature. Few studies have focused on experimental investigation into the reliability of rubrics (Meier, Beverly, & Cady, 2006), and far fewer still on the impacts of training for teachers who use rubrics to assess their students' performance. Considering the wide use of rubrics as assessment tools at every educational level, and the general confidence with which teachers implement them (Rezaei & Lovorn, 2010), rubric reliability are of paramount importance. The purpose of this study was to investigate rubrics by measuring the impacts

of training pre-service and new in-service teachers in the construction, use, and evaluation of rubrics as writing assessment tools.

Generalized studies indicate that rubrics benefit teachers and students in various ways. Notably, rubrics save time, enable teachers to provide more meaningful feedback, support equity in evaluative processes, and encourage thoughtful self-reflection (Beyreli & Ari, 2009; De La Paz, 2009; Spandel, 2006). Rubrics have been shown to reduce stakeholders' confusion about evaluative expectations, help teachers refine teaching skills, encourage students' critical thinking, help students use detailed feedback to improve writing, and facilitate students' communication with peers and teachers (Engbers, 2009; Gallavan & Kottler, 2009; Gustafson & Bochner, 2009; Jonsson & Svingby, 2007; Spandel, 2006).

Intense pressures to conform to the dictates of the No Child Left Behind Act (2001), however, have caused school systems to redouble their focus on

assessment and led to testing of students' academic knowledge and skills at nearly every level of their K-12 experience. It has been observed that of all academic areas, reading and writing have been subjected to the most rigorous and constant assessment (Rezaei & Lovorn, 2010). Rubrics used in the assessment of students' writing skills and abilities are often designed to evaluate components of composition such as form, thoroughness, grammar, syntax, and spelling. Rubrics may also be used to evaluate English proficiency, comprehension of subject matter, and/or cognitive development (East, 2006; Elliot, 2005; Huang, 2008). Research in this area has revealed a significant correlation between students' verbal/writing skills and academic success factors such as intelligence, critical thinking, and self-esteem (Follman, 1993; Munoz, Frick, Kimonis, & Aucoin, 2008; Skaalvik & Skaalvik, 2004; Spence, 2010). These findings contributed to the increasing popularity of assessment through writing throughout the 1980s and 1990s.

As the use of rubrics increased, teachers reported feeling more confident and consistent in their assessments (Jonsson & Svingby, 2007; Silvestri & Oescher, 2006; Stevens & Levi, 2005), and shared common assumptions that rubrics improve inter-rater reliability (Kohn, 2006; Rezaei & Lovorn, 2010). A study by Spandel (2006) revealed that teachers also assumed rubrics provided higher degrees of evaluative objectivity, uniformity, and dependability, and that using rubrics was better than not using them. Research also revealed, however, that although teachers and administrators may perceive rubrics as inherently reliable (Jonsson & Svingby, 2007; Silvestri & Oescher, 2006), these instruments do not guarantee effective assessment (Ross-Fisher, 2005; Tomkins, 2003). Mabry's study (1999) even suggested that rubrics may sacrifice validity to increase reliability.

More recently, increasing numbers of teachers, administrators, and researchers have challenged collective assumptions that simple use of rubrics leads to increases in inter-rater reliability, evaluation accuracy, and/or quality of assessment (Chapman & Inman, 2009; Dawson, 2009; Kohn, 2006; Reddy &

Andrade, 2010; Stellmack, Konheim-Kalkstein, Manor, Massey & Schmitz, 2009). Research indicates that more educators hold the opinion that rubrics, in and of themselves, offer no guarantee of effective evaluation, particularly in terms of students' individual writing idiosyncrasies or their unique understanding of concepts (Cooper & Gargan, 2009; Lumley & McNamara, 1995; Malouff, 2008); and may even narrow and bias raters' visions of good writing (Read, Francis & Robson, 2005; Schafer, Gagné & Lissitz, 2005; Tomkins, 2003; Wilson, 2007). Students who write neatly and display better basic writing mechanics, for instance, regularly receive higher marks on their essays than students who lack these skills, even though their attention to content is otherwise identical (Briggs, 1970; Chase 1968; Gage and Berliner, 1992; Markham, 1976).

Teachers' misuses, biases, and inconsistencies related to rubrics may be due to inadequate training. Turley & Gallagher (2008) suggested that teachers untrained in rubric purpose, design, and implementation often use the instruments improperly, rely on them too much, or see no value in them at all. Wilson (2007) concluded that many poorly trained teachers use rubrics in ways that compartmentalize and bias their evaluations of students' reading and writing skills. Additionally, Rezaei & Lovorn (2010) found that poorly trained or untrained teachers who use of rubrics to assess students' writing submissions are significantly less consistent in their evaluations than those who receive adequate or good training on rubric construction and use. Conversely, with effective rubrics training, raters' abilities to reliably interpret scoring items are significantly improved (Knoch, Read & Randow, 2007; Schafer, Swanson & Bene, 2001; Stuhlmann, Daniel, Dellinger, Denny & Powers, 1999; Thaler, Kazemi & Huscher, 2009). Studies indicate that high quality, intensive rubrics training significantly improves reliability of assessments, particularly among new teachers (Dunbar, Brooks & Kubika-Miller, 2006; Hitt & Helms, 2009; Maxwell, 2010).

To advance understandings of the impacts of rubrics training among pre-service and new in-service teachers, researchers sought to answer the following questions:

- 1.) What constitutes high quality, intensive rubrics training?
- 2.) How is the reliability of assessment through a rubric impacted by high quality, intensive training of raters?; and
- 3.) How does high quality, intensive rubrics training affect participants' approach to the construction, use, and evaluation of rubrics as writing assessment tools?

### Phase 1 of the Study

In Phase 1 of the study, participants (N=326) were asked to examine and evaluate two writing samples that were offered as responses to the following prompt:

*"In an essay, discuss economic globalization in terms of its history; economic, social, and political impacts; and how information technology has influenced the speed of globalization in terms of outsourcing and off-shoring."*

Researchers presented participants with two sample essays that were different in content and mechanics. These purposefully distinct essays were designed in a manner that would allow researchers to measure rating trends among the groups. The first sample ("Essay I") was well written in terms of sentence structure, spelling, grammar, and punctuation; however, the author did not fully answer the question and neglected to cite sources as required. The second sample ("Essay II") fully answered each part of the question and cited sources, but included multiple errors in structure, spelling, grammar and punctuation.

The rubric used in this study (Appendix C) was very similar to writing assessment rubrics currently being used to evaluate comprehensive exams in education programs at various universities across the United States. It was adapted for use in this study with assistance of education assessment faculty at a major university in Southern California, and contained the following criteria:

- *Structural organization and clarity (25 points)*
- *Understanding and synthesis of argument (25 points)*

- *Understanding the goals and implications of globalization (25 points)*
- *Support and citation of sources (15 points)*
- *Writing mechanics (10 points)*

The rubric was designed for analytic, numeric evaluation, and the scores for criteria were summed for a total on a 100-point scale. Researchers agreed this design best fit the study because the 100-point scale is commonly used in K-12 and higher education, and participants in each group would be familiar with it.

Researchers purposefully divided participants into four groups to draw comparisons between rubrics users and non-users, and teachers and non-teachers. Group 1 (N=71) consisted of graduate education students who were asked to rate Essay I. Group 2 (N=108) consisted of graduate education students who were asked to rate Essay II. Most group 1 and group 2 participants were new classroom teachers, averaging between two and three years of work experience in schools. Group 3 (N=84) consisted of non-teachers who were asked to rate Essay I. Group 4 (N=72) consisted of non-teachers who were asked to rate Essay II. Groups 3 and 4 were a mix of graduate and undergraduate business and marketing majors, selected for their relative knowledge of the essay topic. All participants were asked to grade their essays first without and then with the rubric.

This study used standard error of measurement to evaluate the reliability of assessment with rubrics because it is considered more appropriate for a criterion-based assessment (Feldt & Qualls, 1999). Researchers presented participants with Essay I or Essay II and asked each of them to grade it accordingly (Appendix A). A standard deviation less than the 5% range margin of error was considered acceptable in this study. Researchers used within group design for this study. Participants were grouped and studied in this manner because random division of participants was not practically possible. This design maximized comparability of the two assessments under these research conditions.

### Experiment 1 (Phase 1)

Group 1 and Group 3 participated in Experiment 1 and were asked to evaluate and grade Essay I on a

100-point scale (Appendix A). Although Essay I was well-written in terms of skills and mechanics, it offered only a broad description of economic globalization, and it did not fully address any element of the prompt. Participants graded the essay first without specified grading guidelines, and then with the rubric (Appendix C). Participants were not made aware of the writer’s identity, age, or level of education, but were instructed to assume the writer was a student of an advanced social studies class. The goal of Experiment 1 was to evaluate how participating raters were influenced by and/or impressed with the mechanics and superficial characteristics of the essay, rather than the correctness or the accuracy of the answer.

**Experiment 2 (Phase 1)**

Group 2 and Group 4 participated in Experiment 2. The research design was similar to that of Experiment 1 (the same prompt and the same rubric were used); however, participants were given Essay II (Appendix B). Unlike Essay I, Essay II accurately addressed all parts of the prompt and according to the rubric, deserved a high score because the writer answered all questions and used a variety of proper sources (references) in a complete and concise response. The penmanship of Essay II; however, was obstructed by 20 structural, mechanical, spelling and grammar errors. These 20 spelling and grammar errors were purposefully inserted into Essay II to investigate how mechanics influenced the raters’ grading.

**Phase 1 Results**

Table 1 shows the distribution of participants in this study categorized into the four groups. Table 1 also shows a comparison of assigned grades with and without rubrics for each of the four groups. As shown in the table, the assigned scores with the rubric are lower than the assigned scores without the rubric.

Table 2 shows that for all groups this difference is significant.

**Table 1** – Assigned scores with and without a rubric (Sample size: 335)

| Groups             |      | without | with  |
|--------------------|------|---------|-------|
| Wrong Answer Ed    | Mean | 79.55   | 68.00 |
|                    | N    | 71      | 71    |
| Correct Answer Ed  | Mean | 72.78   | 58.50 |
|                    | N    | 106     | 108   |
| Wrong Answer Bus   | Mean | 67.83   | 58.38 |
|                    | N    | 84      | 85    |
| Correct Answer Bus | Mean | 73.1    | 59.19 |
|                    | N    | 71      | 72    |
| Total              | Mean | 73.63   | 64.57 |
|                    | N    | 356     | 467   |

**Table 2** – Testing difference between assigned scores with & without rubrics (Sample size:335)

| Groups             | With-out | with  | t      | sig   |
|--------------------|----------|-------|--------|-------|
| Wrong Answer Ed    | 79.55    | 68.00 | -9.08  | <.001 |
| Correct Answer Ed  | 72.78    | 58.50 | -12.54 | <.001 |
| Wrong Answer Bus   | 67.83    | 58.38 | -7.723 | <.001 |
| Correct Answer Bus | 73.1     | 59.19 | -9.832 | <.001 |

Table 3 shows that in both experiments the range and the variance of assigned scores increased significantly after using the rubrics.

**Table 3** – Range and variance of assigned scores with and without rubrics (Sample size: 335)

| Groups             |           | With-out | With   |
|--------------------|-----------|----------|--------|
| Wrong Answer Ed    | Std. Dev. | 10.50    | 15.05  |
|                    | Minimum   | 49.00    | 32.00  |
|                    | Maximum   | 96.00    | 100.00 |
| Correct Answer Ed  | Std. Dev. | 10.03    | 14.98  |
|                    | Minimum   | 27.00    | 12.00  |
|                    | Maximum   | 98.00    | 98.00  |
| Wrong Answer Bus   | Std. Dev. | 10.19    | 14.31  |
|                    | Minimum   | 40.00    | 21.00  |
|                    | Maximum   | 90.00    | 86.00  |
| Correct Answer Bus | Std. Dev. | 12.59    | 14.86  |
|                    | Minimum   | 25.00    | 27.00  |
|                    | Maximum   | 100.00   | 100.00 |

Table 4 shows details of the grading using the rubric in each experiment.

**Table 4** – Assigned scores for each of the 5 categories of the rubric (Sample size: 335)

| Essay                     | N   | Min   | Max    | Mean  | SD    |
|---------------------------|-----|-------|--------|-------|-------|
| <b>Wrong Answer</b>       |     |       |        |       |       |
| Organization (25 pts)     | 287 | .00   | 25.00  | 16.55 | 5.09  |
| Synthesis (25 pts)        | 287 | 3.00  | 25.00  | 17.86 | 4.66  |
| Specific answers (25 pts) | 287 | 2.00  | 25.00  | 18.15 | 4.55  |
| Citation (15 pts)         | 287 | .00   | 22.00  | 8.65  | 4.58  |
| Mechanics (10 pts)        | 287 | .00   | 10.00  | 7.00  | 3.17  |
| Rubric (100 pts)          | 287 | 21.00 | 100.00 | 68.21 | 16.01 |
| <b>Correct Answer</b>     |     |       |        |       |       |
| Organization              | 180 | 2.00  | 25.00  | 13.52 | 4.95  |
| Synthesis                 | 180 | 3.00  | 25.00  | 15.43 | 4.16  |
| Answer                    | 180 | .00   | 25.00  | 16.05 | 4.66  |
| Citation                  | 180 | 1.00  | 19.00  | 9.29  | 3.83  |
| Mechanics                 | 180 | .00   | 10.00  | 4.47  | 3.17  |
| Rubric                    | 180 | 12.00 | 100.00 | 58.77 | 14.90 |
| <b>Total</b>              |     |       |        |       |       |
| Organization              | 467 | .00   | 25.00  | 15.38 | 5.25  |
| Synthesis                 | 467 | 3.00  | 25.00  | 16.92 | 4.63  |
| Answer                    | 467 | .00   | 25.00  | 17.34 | 4.70  |
| Citation                  | 467 | .00   | 22.00  | 8.90  | 4.315 |
| Mechanics                 | 467 | .00   | 10.00  | 6.02  | 3.40  |
| Rubric                    | 467 | 12.00 | 100.00 | 64.57 | 16.24 |

Multivariate Analysis of Variance (MANOVA) was used to compare participants' ratings. Participants from Group 1 and Group 2 (pre-service and in-service teachers) were compared to Group 3 and Group 4 (business and marketing majors). Table 5 shows that education-field participants rated Essay I significantly higher than Essay II. By contrast, business and marketing participants rated both essays similarly.

### Phase 2 of the Study

Phase 2 of the study was designed to test if adequate and appropriate training for developing and using rubrics will significantly lower the range and the variability of scores among participants, and therefore

increase the inter-rater reliability when compared to results of Phase 1.

**Table 5** – Comparing teachers enrolled in the college of education (Ed) with masters students from the college of business and marketing (Bus). (Sample size: 335)

| Group          | Subgroup           | Mean   | Std. Error | 95% Confidence Interval |             |
|----------------|--------------------|--------|------------|-------------------------|-------------|
|                |                    |        |            | Lower Bound             | Upper Bound |
| With rubric    | Wrong Answer Ed    | 68.00  | 1.76       | 64.53                   | 71.47       |
|                | Correct Answer Ed  | 58.58  | 1.44       | 55.74                   | 61.42       |
|                | Wrong Answer Bus   | 58.354 | 1.62       | 55.16                   | 61.54       |
|                | Correct Answer Bus | 58.965 | 1.76       | 55.49                   | 62.43       |
| Without rubric | Wrong Answer Ed    | 79.554 | 1.28       | 77.04                   | 82.07       |
|                | Correct Answer Ed  | 72.78  | 1.04       | 70.72                   | 74.84       |
|                | Wrong Answer Bus   | 67.833 | 1.17       | 65.52                   | 70.14       |
|                | Correct Answer Bus | 73.099 | 1.28       | 70.58                   | 75.61       |

### Phase 2 Methods and Instruments

To begin Phase 2, researchers conducted a free two-hour workshop on the development, appropriate uses, and potential pitfalls of rubrics. The workshop was based on rubric development and use strategies outlined in *Introduction to Rubrics: An Assessment Tool to Save Grading Time, Convey Effective Feedback and Promote Student Learning* (Stevens & Levi, 2005). Researchers selected this book and used it in the development to develop the high quality, intense training event for several reasons. First, upon initial investigation into concise volumes that are primarily concerned with rubrics training, the Stevens and Levi book came highly recommended by respected assessment experts and colleagues. Second, the book was a recent publication by well respected authors in the field of rubrics training and assessment. Third, the researchers included an extensive bibliography of significant studies related to the need for rubrics training among new and pre-service teachers, many of which were cited in both phases of this study. Fourth, this book was specifically geared toward pre-service and new in-service teachers. And finally, the outline of the book was most conducive to the time allotment researchers



had set aside for training activities. The book was used as the central resource around which the training workshop was developed and conducted.

All Phase 2 participants (N=55) were pre-service or in-service teachers and were selected by judgment sampling. This smaller group was a limitation of the study, but a common challenge of between-subjects design. Due to class size and availability, the same workshop was conducted on two occasions, and participants were allowed to attend either of the sessions. Both workshop sessions were held in the evening at a major research university where each of the participants was either a current or recent student. The first session was attended by 32 participants, 22 of whom were male and 10 of whom were female. The second session was attended by 23 participants, 12 of whom were male and 11 of whom were female.

The workshop was comprised of three components: 'Understanding and Development of Rubrics', 'Use of Rubrics', and 'Potential Pitfalls of Rubrics'. The 'Understanding and Development of Rubrics' component was subdivided into discussions on what rubrics are and why teachers use them, key stages in constructing a rubric, and how to develop a 3-5 level rubric. Participants were introduced to a variety of rubric definitions, and as a group, were encouraged to settle on one that might work best for the assessment of writing in the social studies classroom. The 'Use of Rubrics' component focused primarily on different reasons to implement rubric assessment and how teachers may use them to evaluate student writing. The 'Potential Pitfalls of Rubrics' component addressed relevant literature and tendencies related to rater biases, rater oversights, and ambient factors that can influence scoring.

Researchers presented workshop components via PowerPoint slides, suggested activities in the Stevens and Levi book, and related paper handouts and group activities. Participants were engaged in the establishment of clear definitions of various types of rubrics and understanding learning situations in which rubric uses would be appropriate and inappropriate. Trainers then facilitated participants' small group development of rubrics for use in assessing writing.

Rubric components were discussed at length before, during, and after the rubric development activity.

Near the end of the workshop, the researchers distributed the same two globalization essays evaluated by participants in Phase 1. Participants were not told that two essays were being distributed. Of the 55 participants, 28 received "Essay I" (Appendix A), and 27 received "Essay II" (Appendix B). The essays were distributed in this manner to evaluate how participants might be influenced by and/or impressed with the mechanics and superficial characteristics of the essay, and/or would recognize correctness or accuracy of the answer.

All participants were asked to silently read the essay they had been given. Upon completion of this task, the rubric (Appendix C) was distributed. Participants were instructed to use the rubric and the skills they had just learned in the workshop to evaluate the writing sample they had been assigned. During this time, each participant was instructed to do so in silence, without collaborating with other participants. Upon completion of the assessment, each participant turned in her/his essay and rubric, and returned to her/his seat. After all essays and rubrics were collected, participants were given about ten minutes to discuss their thoughts on the instruments and their use of them.

For Phase 2, the rubric (Appendix C) was entitled "Social Studies Writing Assessment". Researchers then analyzed the data collected from participants' rubric evaluation of Essay I and Essay II. Data was tabulated and placed in graphs to demonstrate trends, and comparisons were drawn with findings for Phase 1 of the study.

### ***Phase 2 Findings and Discussion***

Researchers predicted that adequate and appropriate training for developing and using rubrics will significantly lower the range and the variability of scores among participants, and therefore increase the scoring reliability when compared to results of Phase 1. The results of the implementation of Phase 2 methods supported this hypothesis. The following tables illustrate findings and include pertinent discussion.

Table 6 reveals Phase 2 assessment results for Essay I, which, although written in a clear, concise, academic tone, did not answer all elements of the prompt, and did not include required citations. Results indicated participants who received training in the development and use of rubrics submitted scores with decreased range and variability. As shown in this table the standard deviation of grades significantly reduced from 16 to 10.7. This indicated an increase in reliability as compared with findings from Phase 1 of the study. Researchers deduced that the training session had a significant positive impact on raters' abilities to implement the rubric when evaluating the writing prompt; however, this table shows that the trained raters did not give low grades, as expected by the researchers.

14.9 to 9.46. This table also shows that the training led to significant score increases in all 5 categories of the rubric.

## CONCLUSIONS

Researchers deduced that the training session had a significant positive impact on this group of raters as well. As range and variability decreased, the rubric scoring attributes became more reliable and accurate, and thus, the rubric became a more valuable assessment tool. It should be noted, however, that training had a more positive effect on the second essay grading rather than the first one. Researchers argue that the training helped raters not to be overly influenced by mechanical errors and to recognize that the writer did not fully answer the

**Table 6** – Scoring for Essay I (Well written but incorrect response) (Sample size: 55)

| Group            | N   | Mean          | SD             | Structural organization and clarity | Understanding and synthesis of material: argument | Understanding goals and implications of globalization | Support and citing sources | Mechanics      |
|------------------|-----|---------------|----------------|-------------------------------------|---|---|----------------------------|----------------|
| Without training | 287 | 68.21         | 16             | 16.55                               | 17.59   | 18.15   | 8.65                       | 7              |
| With training    | 28  | 67.28         | 10.7           | 21.78                               | 16.11   | 16.82   | 3.81                       | 8.7            |
| <i>Sig</i>       |     | <i>P</i> =.68 | <i>P</i> =.017 | <i>P</i> <.001                      | <i>P</i> =.38                                     | <i>P</i> =.129  | <i>P</i> <.001             | <i>P</i> <.001 |

Table 7 reveals Phase 2 assessment results for Essay II, which posited a correct answer supported with citations of the literature, but included several grammar and spelling errors. As with raters of Essay II, participants trained in the development and implementation of rubrics submitted scores with decreased range and variability, therefore increasing reliability. As shown in table 7 the standard deviation of scores was significantly reduced from

essay prompt.

The follow-up investigation also showed that training on the use of rubrics makes teachers more confident in their assessments. For example, in a Post-workshop interview one participant stated:

*"I have been using rubrics for years. I can't believe I was never trained to use them. Without knowing what to look for, I can see how they [rubrics] aren't*

**Table 7** – Scoring for Essay II (Poorly written but correct response) (Sample size: 55)

| Group            | N   | Mean           | SD             | Structural organization and clarity | Understanding and synthesis of material: argument | Understanding goals and implications of globalization | Support and citing sources | Mechanics      |
|------------------|-----|----------------|----------------|-------------------------------------|---|---|----------------------------|----------------|
| Without training | 180 | 58.77          | 14.9           | 13.52                               | 15.43   | 16.05   | 9.29                       | 4.47           |
| With training    | 27  | 83.11          | 9.46           | 19.81                               | 21.52   | 20.81   | 13.74                      | 7.22           |
| <i>Sig</i>       |     | <i>P</i> <.001 | <i>P</i> =.008 | <i>P</i> <.001                      | <i>P</i> <.001                                    | <i>P</i> <.001  | <i>P</i> <.001             | <i>P</i> <.001 |

*much better than any other strategy. I will make sure to read each box on the rubric in the future.”*

Another participant echoed this thought by stating:

*“I learned that if teachers are going to use rubrics, they should know HOW to use them. I can see how some people grade much harsher without one, but I can also see how having one can give teachers a false sense of security. I think I’ll make my own rubrics from now on and stop using the ones in the textbook.”*

Considering the literature and the findings of this study, researchers conclude that the feedback made available to students when rubrics are used is better than the assignment of a simple letter grade; however, untrained users of rubrics may simply use it to justify their biased assessment (Kohn, 2006; Lumley & McNamara, 2002). Regardless of whether biased judgments are made consciously or unconsciously, they can be detrimental to a student’s development; and researchers in this study are confident these and other evaluation problems may be effectively addressed with high quality, intense rubrics training. Participants in this study rated the essay based on skills they had gleaned from the workshop, and as a result, it appears they reduced or eliminated several of the mistakes made in Phase 1 of the study, such as giving points for citation in the essay that did not include any citations and deflating a grade based on spelling and grammatical errors.

It is clear that high quality, intense training related to the development and use of rubrics had a significantly positive impact on their reliability as tools for assessing students’ writing (Wills, 2003). By being asked to contemplate what rubrics are and why we use them, by being exposed to the key stages in constructing a rubric, by being caused to focus on different reasons to implement rubric assessment and how to use them to evaluate student writing, and by learning of potential pitfalls to avoid when implementing rubrics, participants demonstrated greater command of rubric assessment tools.

It should be noted that several limitations may have impacted findings of this study. First of all, due

to time constraints, the training of participants was presented in a short-term, intense workshop. Researchers agreed that an extended training event or series of events would have been more effective in preparing educators to use rubrics in the evaluation of students’ writing. Second, this study focused only on rubrics as developed tools used to assess students’ writing, and does not portend these findings may be generalized in application to other uses of rubrics. Third, the difference between the essays may have presented a problem in measuring raters’ consistency using the rubric. Because they were written about the same topic, with one simply falling short of several evaluative measures, however, researchers argue this was only a minor limitation. Fourth, the sample group of the second phase of the study was considerably smaller than the sample group of the first phase. This was due, in part, to the fact that researchers had a smaller available pool of participants at the time of the second phase.

As mentioned earlier, many teachers use rubrics simply because they believe using *any* rubric is better than assessing without a rubric. Researchers of this study understand the many benefits of using rubrics in assessment, and realize that rubrics should be well-designed, topic-specific (contextual), analytic, and complemented with exemplars to be effective. Rubrics in and of themselves, however, do not guarantee effective or accurate assessment of students’ writing or a heightened degree of inter-rater reliability (Newell, Dahm & Newell, 2002; Wilson, 2006). As stated earlier, training of pre-service and in-service teachers is ultimately necessary if rubric reliability is to be positively impacted. Additionally, rubrics should be developed and implemented locally, for specific purposes, and for specific group of students. As with other assessment tools, improper use is sometimes worse than not having used the tool at all. With high quality, intense training, however, rubrics can allow teachers to evaluate more effectively by providing timely feedback, preparing students to use that feedback, encourage their critical thinking and self reflection, and facilitate their communication with peers and others.



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## APPENDICES

### Appendix A – Essay I: Inadequately addressed prompt with no appropriate citations; no spelling and grammar errors

#### Question:

Write an essay about globalization in which you explain:

- A. a brief history of globalization
- B. its economical, social, and political impact
- C. how information technology has influenced the speed of globalization
- D. outsourcing and off-shoring as the implications of globalization

#### Answer:

Although globalization is often thought of in economic terms (i.e., "the global marketplace"), this process has many social and political implications as well. Many in local communities associate globalization with *modernization* (i.e., the transformation of "traditional" societies into "Western" industrialized ones).

There are heated debates about globalization and its positive and negative effects. While globalization is thought of by many as having the potential to make societies richer through trade and to bring knowledge and information to people around the world, there are many others who perceive globalization as contributing to the exploitation of the poor by the rich, and as a threat to traditional cultures as the process of modernization changes societies. There are some who link the negative aspects of globalization to terrorism. To put a complicated discussion in simple terms, they argue that exploitative or declining conditions contribute to the lure of informal "extremist" networks that commit criminal or terrorist acts internationally. And thanks to today's technology and integrated societies, these networks span throughout the world.

Increasingly over the past two centuries, economic activity has become more globally oriented and integrated. Some economists argue that it is no longer meaningful to think in terms of national economies; international trade has become central to most local and domestic economies around the world. Economists project that, in the U.S., more than 50 percent of the new jobs created in this decade will be directly linked to the global economy. The recent focus on the international integration of economies is based on the desirability of a free global market with as few trade barriers as possible, allowing for true competition across borders. International economic institutions, such as the World Trade Organization (WTO) and the International Monetary Fund (IMF), facilitate this increasingly barrier-free flow of goods, services, and money (capital) internationally. Regionally, too, organizations like the North America Free Trade Association (NAFTA), the European Union (EU), and the Association of South East Asian Nations (ASEAN) work towards economic integration within their respective geographical regions.

Many economists assess economic globalization as having a positive impact, linking increased economic transactions across national borders to increased world GDP, and opportunities for economic development. Still, the process is not without its critics, who consider that many of the economies of the industrial North (i.e., North America, Europe, East Asia) have benefited from globalization, while in the past two decades many semi- and non-industrial countries of the geo-political South (i.e., Africa, parts of Asia, and Central and South America) have faced economic downturns rather than the growth promised by economic integration. Critics assert that these conditions are to a significant extent the consequence of global restructuring which has benefited Northern economies while

disadvantaging Southern economies. Others voice concern that globalization adversely affects workers and the environment in many countries around the world.

Though there are many social and cultural manifestations of globalization, here are some of the major ones:  
**Informational services:** On the one hand, the electronic revolution has promoted the diversification and democratization of information as people in nearly every country are able to communicate their opinions and perspectives on issues. On the other hand, this expansion of information technology has been highly uneven, creating an international "digital divide" (i.e., differences in access to and skills to use Internet and other information technologies due predominantly to geography and economic status). Often, access to information technology and to telephone lines in many developing countries is controlled by the state or is available only to a small minority who can afford them.

**News services:** In recent years there has been a significant shift in the transmission and reporting of world news with the rise of a small number of global news services. This process has been referred to as the "CNN-ization of news," reflecting the power of a few news agencies to construct and disseminate news. Thanks to satellite technology, CNN and its few competitors extend their reach to even the most geographically remote areas of the world. This raises some important questions of globalization: Who determines what news? What is "newsworthy?" Who frames the news and determines the perspectives articulated? Whose voice(s) are and are not represented? What are the potential political consequences of the silencing of alternative voices and perspectives?

**Popular culture:** The contemporary revolution in communication technology has had a dramatic impact in the arena of popular culture. Information technology enables a wide diversity of locally-based popular culture to develop and reach a larger audience. For example, "world music" has developed a major international audience. Old and new musical traditions that a few years ago were limited to a small local audience are now playing on the world stage.

On the other hand, globalization has increased transmission of popular culture easily and inexpensively from the developed countries of the North throughout the world. Consequently, despite efforts of nationally-based media to develop local television, movie, and video programs, many media markets in countries of Africa, Asia, and Latin America are saturated with productions from the U.S., Europe and a few countries in Asia (especially Japan and India). Local critics of this trend lament not only the resulting silencing of domestic cultural expression, but also the hegemonic reach of Western, "alien" culture and the potential global homogenization of values and cultural taste.

## Appendix B – Essay II: Adequately addressed prompt with appropriate citations; more than 20 spelling and grammar errors

**Question:** Write an essay about globalization in which you explain:

- A. a brief history of globalization
- B. its economical, social, and political impact
- C. how information technology has influenced the speed of globalization
- D. outsourcing and off-shoring as the implications of globalization

**Answer:**

### A. A brief history of globalization

I know that early forms of globalization existed during the Roman Empire, the Arab Empire and Islamic Golden Age, when Muslim traders and explorers established an early global economy across the Old World resulting in a globalization of crops, trade, knowledge and technology; and later during the Mongol Empire, when there was greater integration along the Silk Road. Global integration continued through the expansion of European trade, as

in the 16th and 17th centuries, when the Portuguese and Spanish Empires reached to all corners of the world after expanding to the Americas. I should say this Globalization became a business phenomenon in the 17th century when the Dutch East India Company, which is often described as the first multinational corporation, was established. Because of the high risks involved with international trade, the Dutch East India Company became the first company in the world to share risk and enable joint ownership through the issuing of shares: an important driver for globalization. (Harvey, 2005).

Some says Globalization in the era since World War II was first the result of planning by economists, and politicians who recognized the costs associated with protectionism and declining international economic integration. Their work led to the Bretton Woods conference and the founding of several international institutions intended to oversee the renewed processes of globalization, promoting growth and managing adverse consequences. These were the International Bank for Reconstruction and Development (the World Bank) and the International Monetary Fund. It has been facilitated by advances in technology which have reduced the costs of trade, and trade negotiation rounds, originally under the auspices of GATT, which led to a series of agreements to remove restrictions on free trade. The Uruguay Round (1984 to 1995) led to a treaty to create the World Trade Organization (WTO), to mediate trade disputes and set up a uniform platform of trading. Other bi- and trilateral trade agreements, including sections of Europe's Maastricht Treaty and the North American Free Trade Agreement (NAFTA) have also been signed in pursuit of the goal of reducing tariffs and barriers to trade grand. (Sachs, 2005).

## **B. Its economical, social, and political impact**

Globalization has Very Many aspects which affect the world in several different ways such as:

**Industrial** – emergence of worldwide production markets and broader access to a range of foreign products for consumers and companies. **Financial** - emergence of worldwide financial markets and better access to external financing for corporate, national and subnational borrowers. **Economic** - realization of a global common market, based on the freedom of exchange of goods and capital. **Spread of local consumer products** (e.g. food) to other countries (often adapted to their culture). (Capra, 2002).

**Political** – AS our teachers said globalization is the creation of a world government which regulates the relationships among nations and guarantees the rights arising from social and economic globalization. Increase in the number of standards (rules & laws) applied globally; e.g. copyright laws, patents and world trade agreements. The push by many advocates for an international criminal court and international justice movements.

**Informational** – increase in information flows between geographically remote locations. Development of a global telecommunications infrastructure and greater transborder data flow, using such technologies as the Internet, communication satellites, submarine fiber optic cable, and wireless telephones. **Cultural** - growth of cross-cultural contacts; advent of new categories of consciousness and identities such as Globalism - which embodies cultural diffusion, the desire to consume and enjoy foreign products and ideas, adopt new technology and practices, and participate in a "world culture". **Ecological**- the advent of global environmental challenges that can not be solved without international cooperation, such as climate change, cross-boundary water and air pollution, over-fishing of the ocean, and the spread of invasive species. Many factories are built in developing countries where they can pollute freely. **Social** - the achievement of free circulation by people of all nations. Spreading of multiculturalism, and better individual access to cultural diversity (e.g. through the export of Hollywood and Bollywood movies). However, the imported culture can easily supplant the local culture, causing reduction in diversity through hybridization or even assimilation. The most prominent form of this is Westernization, but Sinicization of cultures has taken place over most of Asia for many centuries.



**Transportation** – fewer and fewer European cars on European roads each year (the same can also be said about American cars on American roads) and the death of distance through the incorporation of technology to decrease travel time. Greater international travel and tourism. Greater immigration, including illegal immigration. (Croucher, 2004).

### **C. how information technology has influenced the speed of globalization**

I no wonder that the 1990s witnessed the emergence of new information technologies that have had a substantial impact on both commerce and society in general. Digital technologies have opened the way towards global networks. Global networks are the networks in which all information and knowledge – also the ideology- necessary for the realization, maintenance and the reproduction of the system – basically the capitalist system. The term “New Economy” is the clearest explanation of how all these information, knowledge and ideology are in close relation to capitalism. <http://mediaif.emu.edu.tr/pages/atabek/GCS7.html>

Given that approximately 50 percent of economic production in OECD countries is now generated by knowledge-based industries, it is no surprise that advanced telecommunications are increasingly viewed as requisites for economic and human development (Crenshaw & Robinson, 2006). It is believed that networking of distributed computing systems not only reduce costs, but also improve the efficiency of resource acquisitions. Since the information and communication technology knows no boundary, it might be also accessed, theoretically, by every ventures using Internet. On the other hand, commerce on the Internet opens not only new forms of trade relationships among world trade participants, but it also restructures the whole market system, mainly as electronic market system, thereby such a system could certainly give opportunities for small firms specially those of third world countries to enter the market, which otherwise was hardly possible. The new information technology redefines the relationship between buyer, seller and middleman, allowing new ways of accessing and tapping information, and price arrangements. The information and communication development in the developing countries has given many positive external effects to the third world countries. No doubt that the information technological revolution has reached African countries too. World-wide fads and pop culture such as Pokémon, Sudoku, Numa Numa, Origami, Idol series, YouTube, Orkut, Facebook, and MySpace. World-wide sporting events such as FIFA World Cup and the Olympic Games are just some examples. Formation or development of a set of universal values. [http://www.uis.unesco.org/template/pdf/cscl/IntlFlows\\_EN.pdf](http://www.uis.unesco.org/template/pdf/cscl/IntlFlows_EN.pdf)

### **D. outsourcing and offshoring as the implications of globalization**

Off course technology has provided new opportunities for globalization of economy and international trade. Offshoring is defined as the movement of a business process done at a company in one country to the same or another company in another country. Production offshoring of established products involves relocation of physical manufacturing processes to a lower-cost destination. Examples of production offshoring include the manufacture of electronic components in Taiwan, production of apparel, toys, and consumer goods in China, Vietnam etc. Almost always work is moved due to a lower cost of operations in the new location. Offshoring is sometimes contrasted with outsourcing or offshore outsourcing. Outsourcing is the movement of internal business processes to an external company. Companies subcontracting in the same country would be outsourcing, but not offshoring. A company moving an internal business unit from one country to another would be offshoring, but not outsourcing. A company subcontracting a business unit to a different company in another country would be both outsourcing and offshoring. (Hunter, 2001).

### **Conclusion**

I don't surprise that supporters of free trade claim that it increases economic prosperity as well as opportunity, especially among developing nations, enhances civil liberties and leads to a more efficient allocation of resources. One of the surprisings of the recent success of India and China is the fear that success in these two countries comes

at the expense of the United States. These fears are fundamentally wrong and, even worse, dangerous. Globalization advocates such as Jeffrey Sachs point to the above average drop in poverty rates in countries, such as China, where globalization has taken a strong foothold, compared to areas less affected by globalization. (Sachs, 2005).

In the other hand critiques of the current wave of economic globalization typically look at both the damage to the planet, in terms of the perceived unsustainable harm done to the biosphere, as well as the perceived human costs, such as increased poverty, inequality, injustice and the erosion of traditional culture which, the critics contend, all occur as a result of the economic transformations related to globalization. They challenge directly the metrics, such as GDP, used to measure progress promulgated by institutions such as the World Bank, and look to other measures, such as the Happy Planet Index ( an index of human well-being and environmental impact, designed to challenge well-established indices of countries' development, such as (GDP) and the Human Development Index (HDI). In particular, GDP is seen as inappropriate, as the ultimate aim of most people is not to be rich, but to be happy and healthy and it is critical to understand what effect the pursuit of those goals has on the environment. They believe most people want to live long and fulfilling lives, and the country which is doing the best is the one that allows its citizens to do so. (United Nations Development Program, 1992).

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**Appendix C – Social Studies Writing Assessment**

|   | Not Passing   | Not Passing   | Passing  | Exceptional  | Your Score |
|---|---|---|--|--|------------|
| Structural organization and clarity<br><b>25 points</b>               | There is no clear purpose; Essay lacks logical progression of ideas; Essay addresses topic but loses focus by including irrelevant ideas; Ideas are unclear and/or not well-developed | Attempts communicate the purpose throughout; Essay includes brief skeleton (introduction, body, conclusion) but lacks transitions; Essay is focused on topic and includes few loosely related ideas; Unelaborated ideas that are not fully explained or supported; repetitive details | Generally maintains purpose; Essay includes logical progression of ideas aided by clear transitions; Essay is focused on the topic and includes relevant ideas; Depth of thought supported by elaborated, relevant supportive evidence provides clear vision of the idea; contains details | Establishes and maintains clear purpose; Essay is powerfully organized and fully developed; The essay is focused, purposeful, and reflects clear insight and ideas; Depth and complexity of thought supported by rich, pertinent details; supporting evidence leads to high-level idea development |            |
|   | 0-6   | 7-13  | 14-19  | 20-25  |            |
| Understanding and synthesis of material: argument<br><b>25 points</b> | Apparent misunderstanding of material; Lack of confidence with subject matter which leads to unconvincing argument  | Limited understanding of material displayed by vague, unclear language; Some confidence with material; does not present a convincing argument   | Developing understanding of material; Confidence with most material, thus presenting fragmented argument   | Clear understanding of material displayed by clear, concrete language and complex ideas; Confidence with all material which leads to strong, convincing, consistent argument   |            |

|   |  |  |  |   |  |
|---|--|--|--|---|--|
|   | 0-6  | 7-13   | 14-19  | 20-25   |  |
| Understanding the goals and implications of globalization<br><b>25 points</b> | Demonstrates a lack of knowledge about the history of globalization, its implications, the role of information technology, outsourcing and off-shoring.  | Demonstrates a little knowledge about the history of globalization, its implications, the role of information technology, outsourcing and off-shoring.   | Demonstrates a general knowledge about the history of globalization, its implications, the role of information technology, outsourcing and off-shoring.    | Demonstrates explicit and extensive knowledge about the history of globalization, its implications, the role of information technology, outsourcing and off-shoring. Promotes engagement and demonstrates a deeper conceptual understanding of key concepts. Critically discusses the pros and cons of globalization. |  |
|   | 0-6  | 7-13   | 14-19  | 20-25   |  |
| Support and citing sources<br><b>15 points</b>                                | Few to no solid supporting ideas or evidence for the essay content; Little to no source citation, or inaccurate citations with no adherence to standard format; difficult to follow; No references or incorrect references | Some supporting ideas and/or evidence for the essay content; Some source citation but somewhat inaccurate; no adherence to standard format; difficult to follow; Few references or some incorrect references | Support lacks specificity and is loosely developed; Mostly accurate source citation according to standard format; Use of references indicate some research | Specific, developed details and superior support and evidence in the essay content; Cites sources accurately and according to standard format; person who engages product will easily be able to access sources based on citation; Use of references indicate substantial research                                    |  |
|   | 0-3  | 4-7  | 8-11   | 12-15   |  |
| Mechanics<br><b>10 points</b>   | Frequent errors in spelling, grammar, and punctuation  | Errors in grammar and punctuation, but spelling has been proofread   | Occasional grammatical errors and questionable word choice   | Nearly error-free which reflects clear understanding and thorough proofreading  |  |
|   | 0-2  | 3-5  | 6-8  | 9-10  |  |

## Appendix D – Raw data

### Participant Raters 1-28 (Essay I), N=28

| Participant | Gender | Workshop Session Attended | Structural organization and clarity | Understanding and synthesis of material: argument | Understanding goals and implications of globalization | Support and citing sources | Mechanics | Total score |
|-------------|--------|---------------------------|-------------------------------------|---|---|----------------------------|-----------|-------------|
| 1           | M      | 1                         | 15                                  | 15  | 15  | 0                          | 8         | 53          |
| 2           | F      | 1                         | 25                                  | 20  | 20  | 5                          | 9         | 79          |
| 3           | M      | 1                         | 20                                  | 10  | 15  | 3                          | 8         | 56          |
| 4           | M      | 1                         | 20                                  | 20  | 25  | 3                          | 10        | 78          |
| 5           | M      | 2                         | 22                                  | 20  | 20  | 0                          | 7         | 69          |
| 6           | F      | 1                         | 24                                  | 21  | 16  | 5                          | 9         | 75          |
| 7           | F      | 1                         | 23                                  | 15  | 15  | 10                         | 9         | 72          |
| 8           | M      | 2                         | 21                                  | 22  | 20  | 6                          | 9         | 78          |
| 9           | M      | 1                         | 20                                  | 20  | 20  | 10                         | 10        | 80          |
| 10          | M      | 1                         | 25                                  | 23  | 20  | 15                         | 10        | 93          |
| 11          | M      | 2                         | 20                                  | 16  | 16  | 0                          | 9         | 61          |
| 12          | F      | 2                         | 20                                  | 14  | 14  | 0                          | 10        | 58          |
| 13          | M      | 2                         | 21                                  | 20  | 24  | 2                          | 9         | 72          |
| 14          | F      | 1                         | 20                                  | 14  | 14  | 1                          | 8         | 57          |
| 15          | M      | 2                         | 19                                  | 18  | 10  | 2                          | 10        | 59          |

**Participant Raters 1-28 (Essay I), N=28**

| Participant | Gender | Workshop Session Attended | Structural organization and clarity | Understanding and synthesis of material: argument | Understanding goals and implications of globalization | Support and citing sources | Mechanics                 | Total score  |
|-------------|--------|---------------------------|-------------------------------------|---|---|----------------------------|---------------------------|--------------|
| 16          | M      | 1                         | 25                                  | 20  | 22  | 2                          | 6                         | 75           |
| 17          | M      | 2                         | 22                                  | 10  | 10  | 3                          | 8                         | 53           |
| 18          | M      | 1                         | 25                                  | 14  | 18  | 5                          | 10                        | 72           |
| 19          | F      | 1                         | 20                                  | 10  | 10  | 4                          | 8                         | 52           |
| 20          | F      | 2                         | 20                                  | 15  | 15  | 7                          | 10                        | 67           |
| 21          | F      | 2                         | 25                                  | 20  | 25  | 10                         | 10                        | 85           |
| 22          | M      | 1                         | 25                                  | 15  | 17  | 5                          | 9                         | 71           |
| 23          | M      | 1                         | 20                                  | 10  | 12  | 0                          | 6                         | 58           |
| 24          | M      | 1                         | 25                                  | 17  | 17  | 0                          | 7                         | 66           |
| 25          | F      | 1                         | 20                                  | 12  | 14  | 4                          | 10                        | 60           |
| 26          | M      | 2                         | 24                                  | 10  | 13  | 0                          | 7                         | 54           |
| 27          | F      | 2                         | 24                                  | 16  | 20  | 1                          | 7                         | 68           |
| 28          | M      | 1                         | 20                                  | 14  | 14  | 5                          | 10                        | 63           |
| <b>Mean</b> |        |                           | <b>21.79</b>                        | <b>16.11</b>                                      | <b>16.82</b>  | <b>3.86</b>                | <b>8.68</b>               | <b>67.29</b> |
|             |        |                           |                                     |   |   |                            | <b>Standard Deviation</b> | <b>10.74</b> |

**Participant Raters 29-55 (Essay II), N=27**

| Participant | Gender | Workshop Session Attended | Structural organization and clarity | Understanding and synthesis of material: argument | Understanding goals and implications of globalization | Support and citing sources | Mechanics | Total score |
|-------------|--------|---------------------------|-------------------------------------|---|---|----------------------------|-----------|-------------|
| 29          | F      | 2                         | 20                                  | 18  | 20  | 15                         | 5         | 78          |
| 30          | M      | 1                         | 19                                  | 20  | 20  | 15                         | 5         | 79          |
| 31          | M      | 1                         | 22                                  | 23  | 15  | 15                         | 4         | 79          |
| 32          | M      | 1                         | 23                                  | 19  | 20  | 14                         | 6         | 82          |
| 33          | F      | 2                         | 25                                  | 25  | 22  | 15                         | 8         | 95          |
| 34          | M      | 2                         | 25                                  | 25  | 20  | 15                         | 7         | 92          |
| 35          | M      | 2                         | 24                                  | 25  | 25  | 10                         | 5         | 89          |
| 36          | F      | 1                         | 21                                  | 21  | 21  | 14                         | 9         | 86          |
| 37          | F      | 2                         | 19                                  | 23  | 21  | 15                         | 10        | 88          |
| 38          | M      | 1                         | 20                                  | 20  | 20  | 15                         | 10        | 85          |
| 39          | M      | 1                         | 10                                  | 18  | 20  | 13                         | 1         | 62          |
| 40          | M      | 2                         | 18                                  | 20  | 22  | 15                         | 10        | 85          |
| 41          | F      | 1                         | 17                                  | 20  | 20  | 15                         | 9         | 81          |
| 42          | F      | 1                         | 24                                  | 25  | 23  | 10                         | 8         | 90          |
| 43          | F      | 2                         | 25                                  | 25  | 25  | 14                         | 10        | 99          |
| 44          | M      | 2                         | 20                                  | 22  | 22  | 15                         | 6         | 85          |

**Participant Raters 29-55 (Essay II), N=27**

| Participant               | Gender | Workshop Session Attended | Structural organization and clarity | Understanding and synthesis of material: argument | Understanding goals and implications of globalization | Support and citing sources | Mechanics   | Total score  |
|---------------------------|--------|---------------------------|-------------------------------------|---|---|----------------------------|-------------|--------------|
| 45                        | M      | 1                         | 19                                  | 20  | 18  | 14                         | 8           | <b>79</b>    |
| 46                        | M      | 1                         | 12                                  | 15  | 15  | 12                         | 0           | <b>54</b>    |
| 47                        | F      | 1                         | 20                                  | 25  | 25  | 10                         | 8           | <b>88</b>    |
| 48                        | F      | 2                         | 15                                  | 19  | 18  | 12                         | 10          | <b>74</b>    |
| 49                        | M      | 1                         | 15                                  | 19  | 15  | 15                         | 10          | <b>74</b>    |
| 50                        | F      | 2                         | 20                                  | 20  | 22  | 14                         | 9           | <b>85</b>    |
| 51                        | M      | 1                         | 20                                  | 25  | 25  | 14                         | 6           | <b>90</b>    |
| 52                        | M      | 1                         | 22                                  | 25  | 22  | 14                         | 7           | <b>90</b>    |
| 53                        | M      | 2                         | 22                                  | 20  | 21  | 15                         | 10          | <b>88</b>    |
| 54                        | F      | 2                         | 21                                  | 24  | 24  | 12                         | 7           | <b>88</b>    |
| 55                        | M      | 1                         | 17                                  | 20  | 21  | 14                         | 7           | <b>79</b>    |
| <b>Mean</b>               |        |                           | <b>19.81</b>                        | <b>21.52</b>                                      | <b>20.81</b>  | <b>13.74</b>               | <b>7.22</b> | <b>83.11</b> |
| <b>Standard Deviation</b> |        |                           |                                     |   |   |                            |             | <b>9.46</b>  |

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