

Practical Assessment, Research & Evaluation

A peer-reviewed electronic journal.

Copyright is retained by the first or sole author, who grants right of first publication to the *Practical Assessment, Research & Evaluation*. Permission is granted to distribute this article for nonprofit, educational purposes if it is copied in its entirety and the journal is credited.

Volume 15, Number 8, May 2010

ISSN 1531-7714

Rubric-referenced assessment in teacher preparation: An opportunity to learn by using

Laura Reynolds-Keefer
University of Michigan-Dearborn

In Andrade and Du (2005), the authors discuss the ways in which students perceive and use rubrics to support learning in the classroom. In an effort to further examine the impact of rubrics on student learning, this study explored how rubrics impacted students learning, as well as whether using rubrics influenced the likelihood that they would use rubrics in the future as teachers. In this study, 45 undergraduate students enrolled in educational psychology were provided rubrics for each of the two writing assignments assigned during the semester. At the end of the semester, students were asked about their use of rubrics as well as the relationship between rubrics and performance. Student perceptions of rubric importance in learning underscored the findings in the earlier study (Andrade & Du, 2005), but also highlighted the importance of using rubrics as preservice teachers. Responses indicated that preservice teachers who used rubrics as students may be more likely to use rubrics in their own teaching.

Teachers and administrators increasingly regard rubrics as important tools in supporting student learning as well as in facilitating more accurate and efficient evaluation of student work products. If assessments are to truly be a part of instruction (Schaefer, Swanson, Bene & Newberry, 2001), the ways students perceive and use rubrics in the process of learning is important. Exploring the impact of rubrics on learning, then, can enhance the ongoing discussion regarding the relationship between student learning and assessment. Some evidence exists considering how rubrics impact student learning and assessment, as well as relating to the impact of rubric use on the quality of student assignments (Andrade, 2000; Andrade & Du, 2005; Hafner & Hafner, 2003).

Few studies have focused on the impact of rubrics on learning, however, findings support the assertions that rubrics facilitate student awareness of learning goals as well as the application of feedback, both important in the assessment and learning cycle (Brookhart, 2003; Zimmerman & Schunk, 2001). Rubrics have been demonstrated to result in well-structured and

well-defined assignments, and also serve to incorporate a transparent formative assessment into the cycle of learning (Brookhart, 2003; Moskal, 2003; Shephard, 2000; Stiggins, 2001). This study sought to build on the work of Andrade and Du (2005) and explore further the ways in which undergraduate students used and perceived rubrics in their own learning, as well as the impact working with rubrics had on their likelihood to use rubrics in the future.

In Andrade and Du (2005), the authors explored the ways in which students perceive and use rubrics to support learning in the classroom. In their study, the authors used focus groups to explore the ways in which a small sample of students used rubrics, and how using rubrics impacted learning. Seven themes emerged from their analysis: communicating teacher expectations; facilitating student planning; facilitating revision and reflection; resulting equitable grading; improving quality of work; and lowering anxiety. Findings point to the dual purpose of rubrics: to facilitate students' metacognitive processes, as well as to integrate the assessment cycle into teaching and learning. In considering the impact of

rubrics, however, it seems important to expand on these findings and explore further how student use rubrics, as well as the role rubrics have in the training of teachers. This study sought to continue exploring student uses and perceptions of rubrics, as well as how the use of rubrics as a student might impact potential use of rubrics as a future teacher.

METHOD

This study sought to continue exploring student uses and perceptions of rubrics, as well as how the use of rubrics as a student might impact the potential use of rubrics by future teachers.

Participants.

Forty-five students enrolled in two undergraduate educational psychology courses agreed to participate in this exploratory study. The educational psychology course was a 300 level offering, and was introductory in nature. The students participating self-identified as Caucasian, Asian, African-American, Middle Eastern, and Multi-racial. The group included 8 males, a proportion consistent with school of education course enrollment figures. The course concentrated on topics including basic learning theory, memory and cognition, instructional design, assessment, and classroom management. In addition to the course, students participated in a 45 hour semester-long classroom observation in a local classroom. Rubrics were used to evaluate student work on the two writing assignments required during the course. Students had access to the rubrics for each writing assignment at the start of the semester, and both writing assignments were evaluated using the same rubric.

Procedures.

As mentioned, Andrade and Du (2005) used focus groups in their earlier work on rubrics. Although focus groups are ideal for discussing perceptions and beliefs with a limited number of participants (Krueger & Casey, 2000), they become less practical with a larger number of participants. Because this study sought to expand on their work with a larger sample, focus groups were impractical. To collect data from a larger number of students, an open-ended questionnaire format allowed students to formulate responses and raise issues they felt were important. Open-ended questions can fall short of measuring the construct and make comparisons across participants difficult (Fowler, 2002); however, this study is confirmatory as well as exploratory (Miles & Huberman, 1994). The open-ended questions allowed

both focus and specificity of individual expression while still clearly defining the construct. An additional exploratory element in this study probed how the use of rubrics in teacher education and training courses might influence attitudes about future practice. Students completed the questionnaire in the last week of class after finishing both writing assignments and receiving grades and comments on each.

Students used a rubric for each of the two writing assignments required for the course (Appendix). The two writing assignments were similar in nature, and the same rubric was used to evaluate both assignments. The rubric was discussed in relation to each assignment two weeks before the due date. In addition, rubrics were discussed as a method of classroom assessment as a part of the course content. Graded papers were returned with the rubric attached, completed by the instructor. During the last week of the course, students completed the questionnaire for this study. Responses were anonymous and were not reviewed until after the courses were completed and final grades submitted.

DATA ANALYSIS

The 9 question questionnaire represented three main conceptual constructs; student process, student perceptions, and student predictions.

1. How (if at all) do rubrics add to your understanding of a teacher's expectations?
2. How (if at all) do rubrics help you plan how to approach an assignment?
3. How (if at all) do you use a rubric in the process of completing an assignment?
4. How (if at all) do rubrics impact your ability to reflect on your work?
5. To what extent (if at all) do you think rubrics impact grading?
6. To what degree (if at all) do you think using rubrics affect the quality of your work?
7. To what extent do rubrics impact the level of anxiety you feel about assignments?
8. Do you think you will use rubrics in your classroom when you teach? Why or why not?
9. Did using rubrics in this class impact the likelihood you will use rubrics in your classroom? How?

Analysis of the questionnaires involved considering student comments in relation to the seven themes highlighted by Andrade and Du (2005) study discussed earlier: communicating teacher expectations; facilitating student planning; facilitating revision and reflection; resulting equitable grading; improving quality of work; and lowering anxiety. Two additional questions were asked that relate to possible future use of rubrics.

This study used a thematic conceptual matrix; responses to questions were clustered by construct and inferences drawn from the responses (Given, 2008; Miles & Huberman, p.131).

Questions 1 through 4 address the construct of student process, specifically the way in which a student actively uses a rubric in working on a given assignment. Questions 5 through 7 address student perceptions regarding the impact rubrics have on their outcome and experience. Questions 8 and 9 address the predictions students made regarding the likelihood they will use rubrics in their classrooms in the future, as well as the impact using rubrics in this class had on that decision.

The analysis involved 5 steps:

- 1) examining responses to the 9 questions,
- 2) creating 3 categories of impact based on earlier study findings,
- 3) developing and coding responses based on existing 3 categories,
- 4) charting results based on categories, and
- 5) writing summary analysis.

Each question was analyzed separately, so that all responses to each item were analyzed and grouped together. After the responses to each question were analyzed, the responses to questions 1-4, 5-7 and 8-9 were grouped together to consider the constructs of process, perception and prediction. Codes were created based on the content and themes within individual questions as well as within the three constructs of process, perception and prediction.

RESULTS

The responses to all questions regarding the impact of using a rubric as a student were generally positive, and students indicated that rubrics are important to their process as learners, as well as in their perceptions of assessment and learning in the classroom. Students indicated rubrics were helpful in completing assignments, and as in Andrade and Du (2005), they

expressed that rubrics gave them insight into teacher expectations. Rubrics were clearly important to most students in the process of completing assignments. Although most comments were positive, areas of concern emerged regarding rubrics as a part of the assessment cycle, as well as student anxiety regarding understanding the rubric. There was less consistency in the construct of student perceptions of rubrics, specifically regarding grading. Students commented that for teachers, grading was easier using rubrics and resulted in consistent feedback; however, numerous students commented that “generic” comments on rubrics were not helpful. Additionally, several students commented that their anxiety increased when instructors used rubrics, stating that the pressure to produce very specific high quality work created discomfort for them as learners. The final construct relating to possible future use of rubrics showed general enthusiasm for using rubrics, but at the same time uncertainty regarding how they are created.

Student process and rubrics

Rubric impact on student process and learning was targeted with questions 1-4 of the questionnaire. These questions were designed to probe how using rubrics impacted (if at all) how students engaged in the process of learning and completing assignments.

How do rubrics add to your understanding of a teacher's expectations?

Question 1 asked students if rubrics added to their appreciation of teacher expectations on a given assignment. All 45 responses indicated that they felt they better understood teacher expectations when the assignment involved a rubric. As in Andrade and Du (2005), students commented that they felt more secure about the details necessary to achieve a good grade. Of the 45 positive comments regarding expectations, 10 specifically indicated expectations regarding assignment structure and length, as well as mechanics were important elements of the rubric. This finding is of interest, as it does not relate to expectations regarding the substance of the assignment, but the value placed on the order and quality of the assignment in a generic way. One student commented “In other classes I didn’t know how many points I would lose for typos, you know? Here I know how many points I got for good editing, how many points for including all the parts of the assignment.” Another student stated “I want to know what order things should appear in. I want to know how you expect the assignment to look. I want to know if I

need references. I want to know if I need a cover page. It is all in the rubric. So are the points.” Other students noted that rubrics sometimes “just repeat” the instructions given by the teacher in class, but that it is useful to have it in written format with the associated points. Several students referenced prior experiences without rubrics and that they found it frustrating to not know what was important to a particular teacher, one student simply stating “I want to know what matters.”

How do rubrics help you plan how to approach and complete an assignment?

When commenting on how rubrics impacted approach and completing of an assignment (questions 2 and 3), responses indicated overwhelmingly that rubrics were an aid to students in both planning and in production of the assignment. The bulk of students responded that they read the syllabus and then began the assignment, using the rubric as a reference point or to answer questions throughout their process. Some comments underscored the importance of rubrics in giving structure to an assignment, essentially providing what one student called “An outline of what it should look like.” Several students stated that they worked through the assignment by reading the rubric and working on one portion at a time, merging all the separate parts before submitting.

One interesting theme within the construct of planning and process related to student allocation of resources. In response to question 2, 4 students commented that they used the rubric to approach the assignment specifically to understand what resources they would need, or how they should allocate time and resources. One student stated “I need to know if I need to do research. I need to know if I need to get books from the library, or have poster board for a presentation.” Another student stated “I always check to see if there is a group component, and how much the group portion is worth.” Another theme in how students use rubrics to approach assignments related specifically to time and effort. Of the 45 responses, 13 mentioned “time” or “schedule” in discussing how they use a rubric to approach an assignment. These responses indicate the importance of rubrics in fully defining the requirements of assignments, but also highlight that they are used also to schedule and allocate student resources.

How do rubrics impact your ability to reflect on your work?

Question 4 probed the role rubrics played in student reflection and revision. Responses indicated that this

was an underutilized element of rubrics, with 8 students responding that they did not think to use the rubric to check their work until after the graded assessment had been returned. One student admitted “I didn’t think about it until I got my graded rubric back for the first assignment and I thought I should have made sure all the parts were in there before I turned it in.” Nevertheless, most students indicated that the rubric was helpful in reflecting on their work before submitting it, with one student commenting that the rubric was essentially a “checklist” to use to make sure you “got everything that needed to be in there.”

Student perceptions of rubrics

Questions 5-7 addressed three aspects of student perceptions regarding outcomes relating to the use of rubrics: grades, quality of work, and level of anxiety.

To what extent do you think rubrics impact grading?

Students indicated that they did feel rubrics impacted grading, but findings were different from Andrade and Du (2005) in that they did not see the impact as being primarily “Better, fairer grades” (p. 5), but instead quicker and more responsive grading. Of the 45 responses, 26 students commented that using rubrics speeded up the assessment process, but did not use the work “fair” (p. 6). Responses indicated that students felt grading occurred in a more timely manner and that comments were helpful; they knew what was lacking in their assignments and specifically why they received the grade they did. One student stated “I get my grades quicker with rubrics. Teachers can get through papers faster, which is good for me. Then I know what to do and not do next time.” Another stated “I can see what I did well, and what I need to work on. It makes it easier to do better next time.” The concept of “fairness” or reliability in grading is nested within these comments; however, the students did not highlight that rubrics create greater reliability in grading.

To what degree do you think using rubrics affect the quality of your work?

Question 6 asked students if they felt rubrics influenced the quality of their work. All responses to this question were positive to the extent that students felt they did better when they received a rubric before working on an assignment. Many of the comments reflected earlier statements regarding student process addressed in questions 1-4; students stated that understanding the expectations of the teacher, the format of the assignment

and the resources necessary to complete it were all important in doing high quality work. One student noted “I do better the closer I follow the rubric. The further away from the rubric I go, the lower my grade is.” Another student commented on experiences in other classes, saying “I had one class that the professor used a rubric but we didn’t have it before we did the assignment. That rubric didn’t help me, it only helped him. The only time a rubric helps me is if I have it the whole time I am working on an assignment.”

To what extent do rubrics impact the level of anxiety you feel about assignments?

Question 7 asked if student anxiety is mediated by the use of rubrics. In Andrade and Du’s 2005 study, this finding was discussed briefly, but highlighted a potentially important impact on student learning. Responses regarding anxiety in this study indicated, with a few exceptions, that having a rubric lowers student anxiety regarding assignments. Many of the comments reiterated earlier statements regarding teacher expectations and resources, but other statements indicate that students experience less anxiety using rubrics for some unanticipated reasons as well. Of 42 responses (3 surveys did not include responses to questions 7) 9 made comments relating to lower anxiety levels because of increased communication between teacher and student. In discussing anxiety levels, 4 students made statements indicating that they felt better able to ask questions of the teacher because they had a rubric. One student commented “Sometimes I feel like I don’t even know what to ask because I am so confused. Having a rubric makes me feel more comfortable asking a question about an assignment and knowing what I need to do.” Another student commented that “A rubric is like a contract. The teacher wants me to do X. I can go ask her more about what she wants, and not feel bad about it. That makes me feel less nervous.”

Student predictions of future use of rubrics

Questions 8 and 9 addressed the idea of prediction, and asked students if they would likely use a rubric in their classroom in the future, and if their experience with rubrics influenced that decision. This construct goes beyond the earlier study in that it considers the longer-term impact of the use of rubrics specifically on those that will be assessing students in the near future.

Do you think you will use rubrics in your classroom when you teach?

Responses were mixed; however, a consistent pattern emerged. Of the 43 responses (two students left questions 8 and 9 blank), 27 indicated students intended to use rubrics themselves. Of those 27 planning to use rubrics in the future, 25 indicated that using rubrics in this education course had a positive impact on their perceptions of rubrics for their future teaching. Students stated they planned to use rubrics because it would cut down on grading time, but also mentioned that it would help students do “better work”. One student stated “I want to tell my students just what I want them to do and learn so I don’t have to deal with bad assignments.” Another commented that rubrics would save her time explaining assignments to students, and would help her talk to students in a more constructive way. Responses paralleled many of the earlier statements regarding the utility of rubrics as a learner, indicating that students appreciate how it helped them both as learners, and as teachers.

Analysis of the 16 responses from students who do not plan to use rubrics in the future highlighted two recurring reasons for their response; they did not feel they knew how to make a rubric themselves, and they did not feel a rubric was applicable to their subject area or grade level. A clear discomfort existed within the responses regarding how to construct a rubric. One student stated “The teacher talked about it, but it seems really complicated, and that you have to know too much stuff ahead of time. It is easier to just grade.” Another simply said “I think it would take too much time, and I don’t know how I decide how many points everything is worth.”

Six students also discussed their belief that rubrics could not be used in assessing all topics or developmental levels. Several early childhood education students simply stated their belief that rubrics were not applicable in the assessment of your children. Others, such as teachers of industrial education and music questioned how useful a rubric was, especially given the nature of the materials they had to assess. These two themes indicate a level of misconception and misunderstanding that influences preservice teacher intent to use rubrics as tools of assessment and learning.

DISCUSSION

Responses indicated that students use rubrics throughout the process of completing assignments, and that their view of rubrics is overwhelmingly positive. This study supports Andrade and Du (2005) in their assertion that rubrics serve as tools for students, and that the ways in which students report using rubrics underscores their potential importance as a part of the assessment cycle (Black and William, 1998; Brookhart, 2003). In considering the role of rubrics in process, perception and prediction of future use, several important themes emerged that indicate new feedback on the importance of rubrics in learning.

Process

Students indicated that they used rubrics to allocate time and resources in the planning and completion of assignments. If students regard rubrics as a “map” or “laundry list” of things that are required to complete the assignment, and allocate their time based on the point value of each assignment component, the student may not gain mastery of the content. Using rubrics in this manner is not inappropriate; however, if this is the primary use of rubrics for some students, they will likely overlook key ideas, concepts and goals critical in learning. In considering this specific use of rubrics, future studies might focus on how much each element of the rubric is used by students.

The use of rubrics as a tool for reflection indicated that a subset of the students did not consider the utility of the rubric for this purpose. This does not indicate a misconception so much as a point which could be emphasized to all students when a rubric is used in class. This indicates a lack of understanding may exist, especially for students new to rubrics, that they are tools only for assessment. The larger issue may be that the emphasis in classrooms needs to be on formative assessment and students as “users” of assessment (Stiggins 2001).

Perception and Prediction

Communication

Responses relating to anxiety identified, as in Andrade and Du (2005) that rubrics lowered anxiety levels, but went on to point out that in part that was due to increased communication between teacher and student. Students indicated they felt more able to ask questions and approach a teacher who used a syllabus. The transparency of rubrics in relation to the assessment

process clearly created the perception for students that the teacher was willing to talk in specifics about expectations and assessment throughout the learning process. Additionally, comments indicated students felt they could ask detailed questions about a task because the rubric gave them the ability to conceptualize the specifics of the assignment. The positive benefits of rubrics on communication should not be underestimated in creating a positive environment for learning and assessment.

Future teaching practices

The second new area explored by this study was the influence using rubrics had on future teaching practices. Students reported that they felt rubrics were tools they would use in the future, and indicated that using rubrics as learners made them more likely to do so as teachers. This is an important consideration in the training of teachers and administrators; modeling the use of rubrics may increase the likelihood they will be used in the future. This study is limited in that it is exploratory and uses a self report measure; however, indications are that by modeling using rubrics, future teachers are more likely to use them in the future.

Responses about future use also indicated reluctance toward using rubrics as teachers because of uncertainty regarding creating rubrics. For many students, later courses in methodology and assessment will likely demonstrate how to create the different types of rubrics. Nonetheless, this highlights that spending instructional time on creating rubrics at some point is critical to students considering it as a tool.

One interesting misconception that emerged in considering future emerged from student comments stating that rubrics were not appropriate for younger children, or appropriate for specific subject matter. Again, these beliefs might be addressed in later education and methods courses; however, they indicate that when discussing rubrics, it is critical that a diverse set of examples be presented to students in order to underscore the flexibility of rubrics in relation to content and levels of development.

CONCLUSIONS

This study was both confirmatory and exploratory, and sought to continue the discussion of how students use rubrics as a part of learning and assessment. The use of self-report data as well as sample size limits the ability to make recommendations; however, the responses highlight the ways in which students use rubrics, and the

benefits the use of rubrics have on learning and the classroom. Students reported that rubrics were useful throughout the process of completing assignments, and responses indicated areas in which the many uses of rubrics could be emphasized during instruction to maximize utility. Students also highlighted that by creating a more specific and open assessment tool, they felt an increased ability to communicate questions and ideas regarding assignments. Additionally, students report a greater likelihood of using rubrics in the future because of their experience with rubrics as students. Future studies should consider how students use each element of rubrics for learning, as well as how preservice teachers best learn how to create and use rubrics in their classrooms.

REFERENCES

- Andrade, H. (2000). Using rubrics to promote thinking and learning. *Educational Leadership*, 57(5), 13-18.
- Andrade, H., & Du Y. (2005). Student perspectives on rubric-referenced assessment. *Practical Assessment, Research & Evaluation*, 10(3). Available online: <http://pareonline.net/getvn.asp?v=10&n=3>.
- Black, P. & William, D. (1998). *Qualitative research for education: An introduction to theory and methods*. Boston: Allyn and Bacon.
- Brookhart, S. (2003). Developing measurement theory for classroom assessment purposes and uses. *Educational Measurement: Issues and Practice*, 22(4), 5-12.
- Fowler, F.J., (2002). *Survey research methods* (3rd ed.). Thousand Oaks, CA: Sage.
- Given, L. (2008). The *SAGE encyclopedia of qualitative research methods*. Thousand Oaks CA: Sage.
- Hafner, J., & Hafner, P., (2003). Quantitative analysis of the rubric as an assessment tool: An empirical study of student peer-group rating. *International Journal of Science Education*, 25(12), 1509-1528.
- Krueger, R., & Casey, M. (2000). *Focus groups: A practical guide to applied research* (3rd ed.). Thousand Oaks, CA: Sage.
- Miles, M. B., & Huberman, A.M., (1994). *Qualitative data analysis* (2nd ed.). Thousand Oaks, CA: Sage.
- Moskal, B.M., (2003). Recommendations for developing classroom performance assessments and scoring rubrics. *Practical Assessment, Research & Evaluation*, 8(14). Available online: <http://pareonline.net/getvn.asp?v=8&n=14>.
- Saris, W.E. & Gallhofer, I.N. (2007). *Design, evaluation, and analysis of questionnaires for survey research*. Wiley-Interscience.
- Schafer, W., Swanson, G., Bene, N., & Newberry, G. (2001). Effects of teacher knowledge of rubrics on student achievement in four content areas. *Applied Measurement in Education*, 14(2), 151-170.
- Shepard, L. (2000). The role of assessment in a learning culture. *Educational Researcher*, 29(7), 4-14.
- Stiggins, R.J. (2001). *Student-involved classroom assessment* (3rd ed.). Upper Saddle River, NJ: Merrill/Prentice-Hall.
- Zimmerman, B., & Schunk, D. (2001). *Self-regulated learning and academic achievement: Theoretical perspectives* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum.

APPENDIX

| Writing Assignment Rubric (100 Points) | | | | | | | |
|---|-------------|---|---|---|---|--|---------------|
| | 0 | 1 | 2 | 3 | 4 | 5 | Points |
| Focus | Not evident | Writing does not address the assigned topic, and is largely unresponsive. | Subject is generally clear but does not focus on the assigned topic. | Subject is clear—although writing misses some important elements of assigned topic. | Writing addresses the assignment adequately. | Writing addresses the assignment exceptionally thoroughly. | |
| Synthesis | Not evident | References practicum and class readings / discussions appear, but no examples or specifics | Extremely limited use of examples from practicum class readings / discussions. | Some use of examples and specifics from practicum, class readings / discussions | Substantial use of examples and specifics from practicum class readings / discussions | Exceptional use of examples and specifics from practicum, class readings / discussions | |
| Development of Argument | Not evident | Essay is not coherent, showing little development of or relationship among ideas. | Essay relies on unrelated generalizations, vague argument, and/or questionable information. | Sequence of ideas is traceable—although paragraphing and structure are faulty. | Ideas are well developed with transitions and a structured presentation. | Exceptionally well developed ideas with smooth transitions and sophisticated presentation. | |
| Organization | Not evident | Student has neglected to edit the paper for content, sequencing or paragraph construction. Ideas and writing are unclear because of organizational weaknesses | Incomplete editing is evident as seen in prevalent unassimilated ideas, unnecessary information, idea repetition, and/or the absence of flow / transitions. | Incomplete editing is evident as seen in unassimilated ideas, unnecessary information, idea repetition, and/or the absence of flow / transitions. | Writing has been edited with only minor organizational flaws remaining. | Writing is exceptionally well edited. Sentences are clear and logical. The essay has almost no organizational flaws. | |
| Mechanics and Language | Not evident | Essay has serious and persistent errors in word choice, grammar, and/or mechanics that make it ineffective. | Essay is seriously impacted by numerous errors in word choice, grammar and /or mechanics that limit effectiveness. | Essay has an accumulation of errors in word choice, grammar and/or mechanics that inhibit clarity. | Essay may have a few errors in word choice, grammar and/or mechanics. | Essay is generally free from errors in word choice, grammar and/or mechanics. | |
| Total (25 possible points*4 = score out of 100) | | | | | | | |

Citation

Reynolds-Keefer, Laura (2010). Rubric-referenced assessment in teacher preparation: An opportunity to learn by using. *Practical Assessment, Research & Evaluation*, 15(8). Available online:
<http://pareonline.net/getvn.asp?v=15&n=8>.

Authors' Correspondence:

Laura Reynolds-Keefer
University of Michigan-Dearborn
lrkeeferr [at] umd.umich.edu