Students As Authentic Researchers: A New Prescription for the High School Research Assignment

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Can tenth graders go beyond writing reports to conduct "authentic" research? English teachers and the school librarian collaborate to gather data in a qualitative action research study that investigates the effectiveness of an assignment that requires primary research methods and an essay of two thousand words. The unit is designed as a performance-based assessment task, including rubrics, student journals, and peer editing. Students develop research questions, write proposals, design questionnaires and interviews, and learn techniques of display and analysis. Concurrently, their teachers gather data from observation, journals, and questionnaires to determine 2(e)TjT d0.R01 Tac e0.001sTjwr 0 eh.t15 TD [(re)5(se)5(ar)1(c)5(h s)1(k)5(i)-1(l)-1(l)-1(s i)-1(n)]TJ

Write a research paper on one of the topics listed below. Your paper should be 2,000 word: include cover page and table of contents, an introduction, body and conclusion. Use at least three

sources of information, both print and electronic, and include at least three quotations with correct citations and a bibliography. Your paper should include two points of view on your subject with evidence to support both viewpoints.

Gays in the Military   Abortion

Drug Abuse   Cloning

grammatically correct report that was copied and provided other people's answers to someone else's question (Gordon 1996, 32). The research process was not internalized in the school library; it was perceived as an extension of classroom practice. Students talked about research as though it was a test; creativity and inquiry were not perceived as part of the process and grades were perceived as the most important measure of success (Gordon 1996).

Implicit in the typical report assignment is an underestimation of what students can do, sending a clear message to them that they are passive recipients of information. Teachers are often disappointed with results, especially when confronted with plagiarism. It has been suggested that students plagiarize because they are taught to do research under a faulty instructional model that is linear (Davis 1994). A step-by-step approach—choosing a topic, narrowing that topic, locating information, taking notes, organizing notes, writing the paper (Kuhlthau 1984)

requires association of new knowledge with what learners already know (Ausubel 1963). Kuhlthau (1997) states, Constructivist type of learning is transferable to situations in the real world. Students learn to think through issues that do not have prescribed responses or prescribed solutions. Students learn to identify what is important to them, to construct new meanings, and to explain their new understanding to others in some way that is authentic to the topic (71). Cognitive theory supports a more flexible model for student research that allows for reflexivity and the idiosyncratic nature of thinking.

Changes in classroom methodology in this century also reflect a paradigm shift from a behavioral model of rote learning that reflected a traditional, essentialist philosophy that was content-centered to the student-active learner (Bruner 1960). Building on Kelly's theory of constructs (1963), Ausubel (1963) hypothesized that, in order for meaningful learning to occur, new information must be linked to existing knowledge. The distinction between rote versus meaningful learning and reception versus discovery has supported pedagogy that requires active learning. Rote learning is verbatim, involving externally dictated stimulus response associations, while meaningful learning is idiosyncratic, requiring the association of new learning material with what the learner already knows (Ausubel 1963).

Piaget (1928) described schemata mental structures by which individuals organize their perceptions into categories to classify specific information, laying the groundwork for constructivist theory. These schemata adapt during the learning process through assimilation, in which the learner integrates new information into existing schemata, or by accommodation, whereby existing schemata are modified to create new mental structures. Piaget's supposition that the individual is a critical thinker from birth laid the foundation for later research in cognition (Kuhlseid 1986) and the movement toward teaching critical thinking skills.

Another initiative that promotes active learning, the problem-solving approach, dates back to the work of Bloom and Broder (1950). Identifying four categories of problem behavior was useful in discriminating between the problem behavior of successful and unsuccessful students: successful problem solvers question their knowledge and use that information to break the problem down into more manageable components.

Trends in information retrieval research parallel those in education (Dervin and Nilan 1986). The cue-

Testing a New Prescription: Students As Authentic Researchers

Action research was the framework for data collection in this study. In the context of an action research assignment, teachers became researchers who evaluated the effectiveness of their pedagogy by observing and collecting data from students. As Hobson (1996) states, "today the idea of teacher researcher has gained greater value, not only in the educational research community, but also among classroom teachers who realize that investigations conceived, implemented, and evaluated by actual teachers in real classrooms among live schoolchildren promise to better stand the tests of practicality and personal relevance" (p. 1). The concept is rooted in the advice of Dewey (1929): practical inquiry should be the substance of educational research. Action research methodology is rooted in the qualitative tradition, growing out of investigation in the social sciences that gathered data from people engaged in behavior in natural settings (Bogdan and Bilken 1992).

The value of library and information skills instruction for students is inherent in the concept of school libraries, and one would expect to find abundant current research on this topic. There is a surprisingly limited number of studies that directly focus on questions of impact and worth of library and information skills instruction (Eisenberg and Brown 1992). Collecting data on a particular method of instruction for a particular set of complex skills is problematic: evaluating the effectiveness of a research assignment is difficult in the context of that assignment. Models such as the Big Six

instructional practices (Powell 1993), includes short-term research projects that require information gathering. Authentic research uses the tools of authentic assessment to evaluate student work and provide feedback for improvement. The model presented in this paper used journal writing and rubrics.

This piece of action research offers a model for practitioners to use with students for two purposes:

1. To design a learning task in the form of a research assignment that would elevate the quality of student research papers
2. To heighten the awareness of teachers and librarian in their roles as reflective practitioners who use the same research methods they are teaching to their students to assess the design of the assignment and the pedagogy used to implement the unit

The setting for the study was Frankfurt International School in Germany, an independent school that serves employees of multinational corporations and government agencies as well as German families. The school has an enrollment of more than 1,600 students on three campuses. The school, located on the largest of these, enrolls more than 400 students from more than 50 countries in the world. The International Baccalaureate (IB), adopted by many American schools to add rigor and enrichment to existing curriculum, involves most eleventh and twelfth graders and requires an Extended Essay of 4,000 words. Teachers undertook the study because they wanted to hone students' analytical thinking skills in order to improve exam scores and Extended Essays.

The librarian designed a research unit in collaboration with a tenth grade English teachers. Every six school days, tenth graders attended an Advisory class in which the librarian taught one of ten pivotal lessons covering the information outlined in Figure 3. (Figure 3 highlights the distinctive features of an authentic research assignment.) Each lesson focused on a different aspect of doing research and provided enough just-in-time support. Class discussion and examples of good and poor student papers helped students distinguish between reporting and researching and this became a recurrent theme in the unit.

Figure 3. An Authentic Research Assignment

Write a paper of 2,000 words that tells the story of your investigation of a question or problem you are curious about. You will collect information from books and electronic sources that will help you focus your topic and you will collect data through interviews, questionnaires or content analysis that will be displayed and analyzed as evidence. The following questions will help you become authentic researchers:

1. What is research and how is it different from reporting?
2. What is a researchable question?
3. How do I do prepare a proposal for my research?
4. How can do we evaluate our own success as authentic researchers?
5. Where do I get information?
6. How do I get data from a primary source?
7. How do I display and analyze data?
8. How do I present my paper using a style sheet?

9. How do we edit and revise our papers using the writing process?
10. How can we evaluate the success of this teaching unit as authentic researchers?

The written work that you will submit as an appendix to your written paper will include:

1. Proposal
2. A journal documenting your progress
3. Your notes from information gathering
4. Your notes, tapes or videos from data collection
5. A rough draft of your paper

The second lesson focused on researchable research questions, examples of good and poor research questions, and criteria for good questions. The lesson highlighted the necessity of background reading and basic inquiry in the writing of a researchable question. The third lesson addressed writing a proposal that included:

x   a researchable question;
x   a rationale establishing why the research was important;
x   a working bibliography of materials used in background reading and other resources that might be useful; and
x   a list of key words and phrases, with definitions, that could be used in searching for information.

Teachers and the librarian designed a rubric to evaluate success in personal management that included criteria for personal engagement with the topic, managing deadlines, asking for help, and organizing materials. Each student used the rubric for self evaluation. Entries from journals kept by student researchers were used to document evaluations. A rubric for grading the research papers, also developed by teachers and the librarian, included criteria such as analysis, supporting evidence, organization, use of language, and referencing. Reference to both rubrics was made throughout the unit.

A fifth lesson reviewed staple information sources and demonstrations of their use. The lesson on primary sources and research methods presented basic concepts such as validity and reliability and methods of data collection for questionnaires and interviews. Students received individual help to support their particular needs. The seventh lesson was most critical for promoting analytical thinking skills. It demonstrated methods of display for data and information (charts, graphs, models, diagrams, photos, drawings) that could be displayed in figures and tables in the paper. Emphasis was on the methods of analysis to discuss and elaborate on the data.

The next lesson explained the methods of citation for quotation and bibliography, presented a style sheet that standardized format for schoolwide use. The ninth lesson took place when the rough drafts were due: students engaged in a peer editing session, working in pairs to share their work and offer suggestions for improvement. The last lesson took place when papers students were returned. Teachers explained that the questionnaire was their instrument for data colle

Figure 4. Student Questionnaire

	Disagree	----------------------			Agree
1. Timelines were reasonable.	1	2	3	4	5
2. Instructions were clear.	1	2	3	4	5
3. Library resources were adequate.	1	2	3	4	5
4. Grading system was fair.	1	2	3	4	5
5. Bibliography Charts were helpful.	1	2	3	4	5
6. Key word list was helpful.	1	2	3	4	5
7. Writing proposals was helpful	1	2	3	4	5
8. Forming a research question was helpful.	1	2	3	4	5
9. I felt well prepared to search for information.	1	2	3	4	5
10. I could get help when I needed it.	1	2	3	4	5
11. I liked using at least one primary method of data collection.	1	2	3	4	5
12. I liked using at least one method of analysis	1	2	3	4	5

What do you think?

13. What were the **best aspects** of this project?

14. What would you **change**?

15. What was the most **difficult task** you had? **Why** was it difficult?

16. How was this research assignment **different** from the way you have done research in the past?

17. What did you learn that will help you do your **Extended Essay** next year?

18. Do you think it was **worth the class time allotted? Why?**

OTHER COMMENTS

To determine teacher response to the unit, a sample of grades from student papers was used. This reflected the success of the unit in terms of student achievement as evidenced by grades. Since rubrics were used, the specific criteria for grading could be analyzed to determine strengths and weaknesses in student papers. Teachers met in a session after the unit was completed to share observations, discuss the results of the students questionnaires, grades, the rubric, and revisions for next year.

How Did Students and Teachers Judge the Unit?

After the final drafts were submitted, 65 students, which represents 66 percent of tenth graders who participated in the assignment, completed questionnaires (see figure 4). Items 1 through 12 used a Likert rating scale of 1 to 5, with 1 indicating strong disagreement and 5 indicating strong agreement. Items 13 through 18 required extended written answers.

Table 2 summarizes the data. The first five columns display student responses. A 1 to 5 Likert scale is problematic because the 3 rating is difficult to interpret; therefore, the number of responses for each item for ratings of 1, 2, 4, and 5 were added to determine N, or the number in the sample. Scores for ratings of 1 and 2 were added to determine the number of respondents who disagreed; scores for ratings of 4 and 5 were added to determine the number of responses who agreed. The last two columns report the percentage of those who agreed and disagreed with each statement. These calculations help to identify trends in the data and are used in the analysis that follows.

Table 2. Summary of Data

	Disagree------------------ Agree							
Questionnaire Items	1	2	3	4	5	NR*	% Disagree	% Agree
1. Timelines	4	11	24	21	4	1	37	63
2. Instructions								

At least 63 percent of student respondents agreed with every statement but one in items 1 through 12, which indicates a positive attitude towards the key components of the assignment mentioned in the questionnaire and toward the process as a whole (see table 2).

Timelines were considered reasonable by 63 percent of respondents. The open-ended question that asked students what they would change to improve the project elicited the response, more time from 25 percent of the respondents. In most cases the same students who were among the

help give ideas. . . .   These comment were written under Other Comments, and do not quantitatively support the conclusions that individual help was adequate. Rather, this qualitative data offers some ins   ight into individual student experiences.

All completed papers included bibliographies. Responses to item 5 in table 2   indicate a positive reaction to bibliography charts, the graphic organizers that helped students keep track of citation information for their sources. Seventy   -eight percent of the students agreed or strongly agreed that the charts were useful. Inspection of the charts midway through the unit signalled that most d or str st d or stronglat snizerompt6e4l(n(0()r38(sy0)]TJ 0 Tc 0 Tw 7t

eir 0 Tdeo itnat20(t)-2(lha)4(t)-2houllctO(or)3(s)-1(t)-2(r)3(o)]TJ e. Responses t t y througn

Although students display a high level of comfort with computers, they need a lot of support in using the Internet as a research tool, and (2) Training in electronic sources is needed for veteran, as well as new   teachers. These two points are reinforced by responses to key words (item 6, table 2). Only 52 percent of students agreed that key words were helpful; teachers thought vocabulary and concepts are vital prerequisites to writing commentary and that key wor   ds need more emphasis. The consensus of teachers at the end   -of-unit meeting was that key words did not get enough emphasis and students did not appreciate their importance.

Reaction to the grading process was positive (item 4, table 2   ). However, 18 percent   of respondents did not rate this item, partly because the questionnaire was administered before grades were known and some students mistakenly understood that they were to rate the actual grade they received rather than the process itself. Teachers critiq   ued the rubric   s assessment descriptors and agreed that wording should be simplified. This was based on several teachers

- x Introduction to the essay
- x Main analysis
- x Supporting evidence
- x Conclusion

Formal Aspects of the Essay

- x Organization
- x Use of language
- x Referencing and layout
- x Mechanics of language

Each criterion was graded by matching the paper with descriptors for four levels, or standards, of performance. Points were earned relative to the standard of descriptor assigned to the paper by the teacher. For example, a paper might satisfy all the descr   iptors for the introduction, earning four points for that criterion, but may more closely resemble the descriptors for the lowest standard of performance for main analysis, thereby earning one point for that criterion. Points earned for the essay were tota

students, teachers decided to provide more time for student practice with peer editing prior to the authentic research assignment. There was consensus that more time for the Grade 10 research paper, and shorter assignments lead ing up to it, were needed even though this will require dropping a literature unit from the curriculum.

2. Provide more practice in using supporting evidence, including citations, in analytical thinking and drawing conclusions.

3. Use plain and direct language to reword assessment descriptors in the rubric to promote a better understanding of assessment criteria.

4. Revise citation instructions and layout of material in the school s style sheet to make it more user -friendly. It was agreed that the style sheet wou ld be more useful in electronic format.

5. Consolidate support materials (e.g., proposal forms, bibliography charts, style sheet) into a booklet to be distributed to:
   a. Students, to eliminate individual hand- outs and simplify organization tasks;
   b. Facult y who are teaching or advising student essays.

6. Offer teachers briefing sessions, in -services, ongoing training, or more support for:
   a. Library resources and access;
   b. Research techniques for qualitative studies.

7. Offer more opportunities for students to practice information searching and expand concepts and key words and reading focused in an area of interest to prepare for the authentic research assignment by building prior knowledge of the topic.

Implications for Teachers and Librarians

The underlying purpose of this study was to collect data that contributed to the reflective practice of classroom teachers and librarians who design and implement research assignments. Based on the positive reactions of students, it is indicated that a new dimension to the research assignment that challenges students to become authentic researchers is desirable. Was the project in authentic research successful? The researcher concludes that the consensus of students and teachers was that the assignment was a good preparation for the Extended Essay and raised awareness of what constitutes a successful assignment. Students responses showed positive attitudes toward the support materials and recommendations for revision of the assignment point toward refinement rather than drastic revision. Structure for student efforts provided by support materials, help when needed, and sufficient time to do the work, emerged as important measures of success for students. Important measures of success for teachers included the use of key words, the use of supporting evidence and referencing in the analytical thinking and the development of an argument, and the quality of discursive writing in both content and form. The authentic research assignment raised the level of appreciation of teachers for the complexity of independent student work.

Another important implication for practitioners is the training that is essential, not only in the use of library resources, but in the use of qualitative research methods for both teachers and students. Such training offers the obvious reward of equipping educators with the tools and expertise they need t o help students, but also equips them for their own action research that will inform their practice as they model the research process for students. This collaboration of students -as-researchers and teachers -as-researchers is a powerful paradigm for raisin g instructional quality in the research assignment.

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