Learning Disabilities as Educational Research Disabilities:

Setting Educational Research Standards

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Abstract

Specific learning disabilities are defined by educational standards. When identified with a learning disability, a student's academic performance can be improved through special educational services. Likewise, educational research needs to be compared to research standards. This paper suggests four educational research standards to be considered. First, educational researchers should write more empirical research papers because these are the bedrock of theoretical papers. Second, researchers need to ensure the construct validity of their research methods by defining and directly measuring variables of interest. Third, critiques of research reports should focus on the substance of the report instead of superficial aspects such as typos. Finally, instead of rehashing problems with Nigerian education, solutions need to be identified. Once educational researchers identify areas where they do not meet educational standards, then further instruction is needed to improve the body of Nigerian educational research.

A student with a specific learning disability has difficulty succeeding in one or more academic domains (Woolfolk, 2007). A specific learning disability is therefore defined by educational standards. Educational experts set standards that students should achieve at each grade level. If a student masters the educational standards in most classes but has a particular difficulty in achieving proficiency in one class, then that student should be tested to identify a potential learning disability. Once a student is identified as having a learning disability, then his or her teachers have a responsibility to provide specialized instruction to help the student overcome the challenges of their particular learning disability. Educational researchers advise that teachers should directly teach skills and strategies that promote academic success to students with specific learning disabilities (Woolfolk, 2007). With special educational provision, students with learning disabilities can improve their academic performance (Jordan, Kaplan, Oláh, & Locuniak, 2006).

Just as students need to be examined for learning disabilities based on their performance in school, educational researchers also need to examine their research practices to determine if they, too, have specific difficulties in one or more areas of scientific research. Just as learning disabilities are defined by educational standards, educational research requires standards that must be achieved by educational researchers. This paper will make a preliminary effort to define standards for educational research in Nigeria. Educational researchers should evaluate their current research practices based on these standards to determine whether they have a "research disability" that requires specialized instruction. Fortunately, research disabilities are easily remedied. Effective postgraduate training and workshops on scientific research methods provide a simple solution to research disabilities.

The purpose of educational research is to improve the teaching-learning environment by scientifically studying the educational context to identify best teaching practices (Gall, Gall, & Borg, 2003). Educational research has the potential to significantly impact

educational practice by identifying instructional practices that improve educational outcomes such as critical thinking, academic achievement, study skills, and students' interest in learning. However, educational research must meet certain standards; otherwise the suggestions from educational research will be ineffective or possibly even critically impair the learning process. When an educational research study does not meet research standards, the conclusions that are drawn are invalid. Without high standards of educational research, teachers may be encouraged to use teaching practices that hurt students' critical thinking skills or motivation. Without high standards of educational research, researchers may suggest ineffective solutions to educational problems. Without high standards of educational research, teachers may misunderstand their students, resulting in teaching practices that hurt students' academic development. Because effective education is of paramount importance to societal development, standards in educational research are vital.

Standard 1: Researchers should write empirical research papers.

At conferences, empirical papers should considerably outnumber theoretical papers. Empirical papers are the bedrock of educational research because they provide the data with which theoretical papers are based (Miller, 2002). Theoretical papers describe a researcher's theory, or belief, about an educational phenomenon based on previous research whereas empirical papers provide an objective description of an educational phenomenon from scientific data. For example, a theoretical paper about the factors that lead to exam malpractice are based on the author's opinion from reviewing scientific studies whereas an empirical paper about exam malpractice is based on data collected in an actual exam malpractice situation. Because empirical papers are based on data whereas theoretical papers are based on informed opinion, empirical papers are more scientifically defensible. However, considerably more theoretical papers are presented at educational conferences in Nigeria.

Only two out of eight papers presented in a paper session at a recent educational conference were empirical papers, one of which was by the current author!

Theoretical papers should only be presented by senior colleagues. Young educational researchers should focus their energies on empirical research so they can build a database of knowledge about important educational issues. Only after an educational researcher has decades of experience analyzing empirical data will they have the knowledge necessary for writing theoretical papers. Consequently, most papers presented at educational conferences should be empirical. To summarize, only presenting theoretical papers at conferences and in journals leads to a research disability.

Indeed, empirical papers must be planned well in advance of a conference because of the extensive planning and efforts required to collect data. Consequently, educational researchers must demonstrate more discipline in their academic work in order to effectively plan and conduct scientific research. Other researchers have difficulty developing empirical research studies because they do not have a foundational understanding of scientific research methods. The best way for a person to learn to conduct educational research is to partner with a more advanced researcher on a study. Thus, experienced researchers need to make themselves available to mentor less experienced researchers. This can be a mutually beneficial relationship: more experienced researchers can use less experienced researchers to do basic research tasks which will save them time, while the less experienced researchers can learn more about research methods while participating in the research activities. However, the more experienced researcher must make the effort to educate the less experienced researcher about what they are doing and why they are doing it. This will increase the quality and experience of the next generation of educational researchers.

Standard 2: Ensure the construct validity of research methods.

All educational research studies must demonstrate strong construct validity. Most educational research studies examine psychological constructs such as critical thinking, academic achievement, or students' interest. Construct validity is concerned with how accurately the psychological construct is operationalized in the research study, meaning how the construct is manipulated or measured. For example, in a study examining the effect of computerized instruction on students' critical thinking, construct validity reflects how well the study implements and controls computerized instruction and measures critical thinking.

The first step in developing a educational research study with strong construct validity is to determine the key constructs, also called variables, that will be studied. The key variables in the example research study are computerized instruction (independent variable) and critical thinking (dependent variable). Once the variables have been identified, then the researcher needs to determine how the variables will be manipulated or measured. To do this, a good construct definition of each variable needs to be developed. For example, if a researcher is trying to determine how a teacher's age influences their attitude toward computerized instruction, then the researcher has two variables that need to be defined and measured: age and teachers' attitude toward computerized instruction. A good construct definition of age is "years that a person has been alive" and a good construct definition of teachers' attitude toward computerized instruction is "the teacher's opinion of the usefulness of computerized instruction." Construct definitions should be based off of previous research studies and theory about the constructs of interest. When a good construct definition has been developed for each variable, then the researcher is ready to determine how that variable will be manipulated or measured in the research study.

Two issues should be considered when a researcher is determining how a variable will be measured. First, researchers must determine the most direct manner in which to measure the variables of interest. If a questionnaire will be used to measure a variable, self-report data

typically is the most valuable (Cohen & Swerdlik, 1999).[1] In self-report data, participants respond about their own characteristics, behavior, thoughts, attitudes, motivations, and other domains of interest (Gall et al., 2003). For example, if a researcher is going to measure teachers' attitude toward computerized instruction, then the researcher should ask teachers to report on their personal attitudes. Students, principals, and parents cannot provide meaningful data about teachers' attitudes because they have no direct knowledge of teachers' attitudes. Since the researcher has defined attitude toward computerized instruction as a teacher's opinion of the usefulness of computerized instruction, nobody but the teacher can report on their own opinion. Reports from any individual besides a teacher about their personal opinion is useless data that will confusticate and confound the results of the study.

The self-report items should be directly related to the definition of the construct. For example, items about the teacher's attitude toward computerized instruction might include *I think computerized instruction will help the students learn more effectively* and *Computerized instruction will only confuse the students.*[2] Note how the items directly measure a teacher's personal opinion about the usefulness of the computerized instruction. Researchers are often tempted to write items that require a leap from the definition of the construct. Examples might include *Students enjoy computerized instruction* or *I am more refreshed at the end of the day when teaching with computerized instruction.* Neither item is valid when compared to the definition of opinion of the usefulness of computerized instruction. The first item focuses on students' enjoyment, not the teachers' opinion of usefulness. The researcher might argue that if the teacher thinks the instruction is useful, then they will be more refreshed at the end of the day. However, there are many reasons why a teacher might be refreshed at the end of the day that are unrelated their opinion of the usefulness of the instruction. Perhaps computerized instruction requires less effort by the teacher so they are more refreshed at the

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[1] One exception to this rule is when studying children as they are too young to understand how to complete a questionnaire. In this case, parental or teachers' report of children's behavior is appropriate.
[2] This is a reverse-coded statement since it is the opposite of a positive opinion.

end of the day, but the teacher might still think that the instruction is useless. Any item that requires an explanation beyond the definition of the construct is invalid and severely damages the quality of the research study. Once items have been written, the researcher must compare each item separately to the variable's construct definition. Items that are not directly related to the construct definition should either be cancelled or revised.

Secondly, each variable in an educational research study must be assessed separately. If the researcher is trying to determine whether a teacher's age influences their attitude towards computerized instruction, then the two variables of interest are the teacher's age and the attitude. Separate items must be developed for each variable in the study. The most direct way to measure a teacher's age is to ask the teacher to report their age. The most direct way to measure attitude toward computerized instruction is to ask the teacher to self-report on their opinion. Once these two variables have been measured separately, then the researcher conducts statistical analysis to determine the effect of age on attitudes. Researchers are often tempted to integrate multiple variables into the same item. For example, *Older teachers do not like the new computerized instruction.* However, this item does not address question of how age influences attitudes toward computerized instruction. Instead, this item examins teachers' **beliefs** of how age influences attitudes toward computerized instruction. This is similar asking students to report on teachers' attitudes. This item asks all teachers to report on older teachers' attitudes toward computerized instruction. Young teachers do not have direct knowledge of older teachers' opinions. Teachers' beliefs of other teachers' attitudes may or may not be accurate. The more direct – and therefore more valid –procedure is to ask teachers to self-report their own attitudes and use inferential statistics to determine the authentic relationship between age and attitude.

To illustrate that key variables must be directly measured in educational research studies, I administered a questionnaire to 45 students enrolled in a Masters of Education

program. Five of the items on the questionnaire were nonsensical statements, such as *Neurotic exams have a negative influence on students' achievement.* This item is meaningless because it applies a personality factor, neuroticism, to exams. Students were to respond with three options: Yes, No, or Not Sure. Because this question was nonsensical, students should have responded with Not Sure. However, students indicated "not sure" on only 30% of the nonsensical items. Over half of the MEd students provided an answer to an illogical item on all or all but one of the five nonsensical statements.

Five additional questions asked MEd students to select which of two goals would result in the highest achievement. For example, two goals that were compared on the questionnaire were *Do my best on the exam* vs. *Earn 65% on the final exam.* Experimental research has provided overwhelming evidence that specific goals lead to higher achievement than "do your best" goals (e.g., Locke, Chah, Harrison, & Lustgarten, 1989, as cited in Reeve, 2001). According to these empirical research studies, the specific goal of earning 65% on the exam will help students to achieve more than the "do your best" goal. However, the MEd students only identified the correct goal on 21% of the items. Indeed, 58% of the MEd students were incorrect on all five items about goals. Only 10% of the students correctly identified all five goals.

Clearly, even MEd students cannot give accurate responses based on their beliefs of educational phenomenon. First, the students did not admit that they do not understand a nonsensical statement. Second, the MEd students had erroneous beliefs that contradicted a large body of empirical research. Based on the MEd students' responses to this questionnaire, a researcher would conclude that teachers should be training their students to set "do your best" goals. However, this conclusion is completely inaccurate. Educational researchers have conducted experiments where students are randomly assigned to set either specific goals or "do your best" goals. When later tested on their actual performance, students in the specific

goal group performed significantly better than the students in the "do your best" group. Since asking postgraduate students about their beliefs of educational phenomenon is inaccurate, researchers must avoid asking all participants about their beliefs. Instead, researchers need to find direct methods of measuring the constructs under study.

Researchers have the burden of measuring a construct in the way that is the most valid. If a questionnaire is being used, the researcher has the responsibility of carefully designing the questionnaire so that the responses directly measure the variable. Errors from participants' responses on a questionnaire are the researcher's fault, not the respondent. Thus, items must be written in a fashion that is understandable to the respondents and allow them to respond in a way that is meaningful. For example, a questionnaire given to students in Primary 5 should use simplified language whereas a questionnaire given to an illiterate adult must be read out loud. Developing a research instrument is not an easy task that can be done overnight. Considerable preparation, pilot testing, and revision of an instrument is necessary so the researcher must plan a research study well in advance of a conference presentation.

As a final point, research studies examining the effects of a new teaching program, counseling intervention, or method of improving education *have* to use an experimental or quasi-experimental design. Both experimental and quasi-experimental designs need at least one treatment group that receives the new educational program and a control group that receives the traditional educational program. The two groups are then compared on direct measures of the dependent variables that the researcher thinks will be improved by the new program, such as academic achievement, motivation for school, or positive educational outcomes. For example, if a researcher wants to determine how computerized instruction influences students' academic achievement, then the researcher has to find valid procedures for manipulating the computerized instruction: one group of students receives computerized instruction while another group of students does not receive computerized instruction. Instead

of a good construct definition of computerized instruction, the researcher needs to give a thorough description of the treatment in the Procedures portion of the Methods section. The researcher also needs to directly measure academic achievement, perhaps by scores on their final exams. After the treatment is complete, both groups take the exams. A *t*-test is conducted to determine whether the students in the computerized instruction group had a significantly higher score on the exams than the control group. Only a significant difference on the dependent variable will indicate that a program is effective. Asking students, teachers, parents, or other stakeholders questions such as *The new teaching program improves students achievement* is simply their beliefs of the effectiveness of the program. These beliefs may or may not be accurate. The only way to determine the effectiveness of a program is to experimentally test students on a dependent variable after receiving the treatment.

Standard 3: Critiques of research reports need to focus on the substance of the report.

There are two fundamental rationales for presenting research papers at academic conferences. First, presenting a research paper enables the author to receive valuable feedback about the quality of their research study from a group of experienced educational researchers. This helps the researcher improve their research skills both on their current study and for subsequent research studies. Second, research presentations provide an opportunity for members of the audience to learn more about education through cutting-edge educational research as well as improve their own understanding of research methods.

At a recent educational conference, I classified each comment made after paper presentations in one paper session. For 8 papers, a total of 51 comments were made. Of those comments, well over half of the comments were superficial (see Table 1). Sadly, an average of one in four critiques were about typographical or formatting errors. This evaluation could easily be made by a person with a secondary school degree. Clearly, this type of feedback is not meeting either objective of paper presentations: to receive feedback about the quality of

the research study or for the audience to learn about education. Indeed, only 1 out of the 51

comments addressed a point about the methods or results of a research study. The third

standard in educational research draws attention to the fact that researchers should critique

the substance of a research report. Indeed, many papers presented at conferences are riddled

with typographical errors and do not adhere to APA formatting. However, these are only

Table 1

Classification of Critiques at a Paper Presentation at an Educational Conference

Type of Comment	Frequency	Percentage
Superficial Comments		
Reframe the title	2	4%
Correct the order of sections	3	6%
Correct references according to APA format	9	18%
Typographical or formatting errors	12	24%
Length of the paper	1	2%
Question the paper's relevance to conference theme	3	6%
Total	**30**	**59%**
Substantial Comments		
Questioning a statement in the paper	2	4%
Additional topics to include in the paper	4	7%
Further discussion of a point in the paper	11	22%
Suggestion to modify the paper's topic	3	6%
Question to clarify the methodology or results	1	2%
Total	**21**	**41%**

superficial problems with the paper that can easily be corrected by a conscientious editor, a responsibility that does not require an advanced degree. If a researcher feels that a presenter has superficial errors that need to be addressed, then the researcher should slip the presenter a note after their presentation. This will not waste time in pointing out obvious errors, something that will not enlighten audience members.

To review a research paper, educational researchers should first briefly skim the introduction to understand the purposes and hypotheses of the study. Next, the methods section should be carefully read to assess the following questions. First, are the research methods written in sufficient detail so that the reader can replicate the research study from the description in the paper? If not, then the presenter needs to provide more detail. Second, do the research methods match the purposes, research questions, or hypotheses of the study? For example, if the purpose of the research study is to examine the effectiveness of computerized instruction, then an experimental or quasi-experimental design must be conducted to examine how student performance compares between students taught by computerized instruction and those taught by the old teaching method. Third, are the variables under study measured in the most direct and valid manner? If a more direct method of measuring the variables is available as described in Standard 2, then the research study needs to be reframed. Fourth, do the statistical analyses match the research questions or hypotheses?

Once the methods section has been thoroughly critiqued, then the researcher should read the results, discussion, and conclusions. Do the conclusions match the results obtained from the data? Oftentimes, researchers try to draw conclusions and make recommendations that are not supported by the research study. For example, a researcher might conclude that students' motivation and class attendance will improve because the computerized instruction was found to improve students' test scores. This conclusion is not supported by the data that was collected by the research study. The study only found that computerized instruction

improved students' academic performance; therefore the researcher can conclude that computerized instruction should be used if a teacher wants to improve their students' academic performance. Any more general conclusion is invalid. Instead, the researcher can conclude that more research needs to be conducted to examine the effectiveness of computerized instructions on students' motivation and class attendance.

Standard 4: Suggest solutions to educational problems.

Educational systems all around the world have problems, although those problems differ from one country to the next. Identifying problems is the first step in improving education because progress cannot occur without having a deep understanding of the problem. Educational researchers in Nigeria have done an excellent job of identifying problems in the Nigerian educational system, such as exam malpractice, poor infrastructure, and uncommitted teachers (e.g., Abeokuta, 2009; Esezobor, 1996; Inabo, 2009; Odia & Omofonmwan, 2007). The problems with Nigerian education are now well documented. Continuing to repeat the persistence of these problems does not provide a ladder to help the Nigerian education system climb to greater heights. Education can only be improved by identifying solutions to these problems. Nigerian educational researchers have reached the stage where they need to start suggesting and evaluating solutions to these problems.

Finding solutions to these problems will require researchers to conduct experiments or quasi-experiments to compare the relative benefits of different solutions. For example, exam malpractice is a widespread problem throughout Nigeria. Many solutions can be offered to curb exam malpractice, such as increasing the level of security within exam halls, having students sign Academic Honesty Pledges that outline expectations for students' academic behavior, creating awareness drives that publicly discourage exam malpractice, and increasing the level of punishment for those caught engaging in exam malpractice. The impact of these four suggestions of curbing exam malpractice can be scientifically evaluated

by conducting a quasi-experiment. To do this, each of the four solutions can be implemented at various academic institutions. The levels of exam malpractice, or attitudes toward exam malpractice, can be compared both before and after implementation. The solutions with the largest impact in reducing exam malpractice will then be identified and implemented nationwide. Identifying solutions to the problems of exam malpractice and other problems facing the Nigerian schools will help improve the quality of Nigerian education.

Nigerian educational researchers should also consider conducting action research studies. Action research provides a platform for researchers to systematically investigate effective solutions to everyday problems (Stringer, 2007). Action research is based on qualitative research designs and its purpose is to obtain a better understanding of a problem and to develop a solution that is situationally appropriate. [3] Nsamenang (2010) believes that qualitative research is more appropriate to the African context, so action research may be one way that educational research can be applicable and beneficial to education in Nigeria.

Conclusion

Early identification of a learning disability is important so that appropriate education can be planned to help the learner overcome the disability (Mash & Wolfe, 2002). Likewise, educational researchers need to identify the areas in which they fall short of standards of valid and useful research. Once a researcher has identified the areas in which they do not meet educational research standards, then he or she can work to overcome the difficulty. Indeed, conducting an educational research study requires hard work and considerable advanced preparation. However, the practical benefits that result from well planned and well conducted research studies are countless.

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[3] For more information about action research, go to http://www.actionresearch.net/

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