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EXPLORING THE RELEVANCE OF UTILIZING SCIENTIFICALLY BASED RESEARCH (SBR) TO ACHIEVE QUALITY GUIDANCE IN EDUCATIONAL DECISIONS IN BUSINESS EDUCATION PROGRAMME

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ABSTRACT

The quest for quality education has posed serious challenges to program planners and administrators on some issues considered as critical in coming out with realistic research reports and the problem of using research to guide education decisions. This paper focuses on how educators (including business educators) can use scientifically based research to improve teaching practices, curriculum decision and school-wide programs. It is intended to guide business teachers and administrators towards understanding, locating and applying scientifically based research to improve students' learning. To achieve this aim, the paper draws the attention of policy makers in business education to the situation as it is in the United States of America. It highlights the Option Actions for leaders of business education program in Nigeria. It concluded among others that the act of gathering, synthesizing, and using SBR are steps to making good decisions about educational programs, products and practices. The paper therefore believes that, proper consideration of SBR will give educators greater confidence in their decision-making and may lead to greater opportunity for students surmount teething challenges in their quest for academic excellence.

Key words: ***Scientifically based research, Option actions, Curriculum decision, School-wide programs.***

INTRODUCTION

In their quests to making students probe, investigate, and inquire about what they are learning and doing, intricate questions are being asked by teachers in their classrooms. In recent times, teachers and administrators are also being asked critical questions about the evidence of the effectiveness of the educational programmes and methods they select for use in their classrooms. The reasons for this focal shift are based on the provisions of the "No Child Left Behind (NCLB) Act of 2001" that require federally funded educational programs to be built on Scientifically Based Research (SBR). For example, a school using government funds to support the introduction of a new literacy/vocational approach must investigate the scientific evidence upon which that program is based. As a result, the way schools make critical decisions about curriculum and instruction will change. For this reason, it is important to understand the motivation behind these requirements. Thus, this paper focuses on how educators can use scientifically based research to inform teaching practices, curriculum decisions, and school wide programs. It is intended to guide teachers and administrators towards understanding, locating, and applying scientifically based research to improve student learning in business education.

The relevance of scientifically based research (SBR)

The trend towards scientifically based educational programs and practices has been a long time coming. For example, the standards of the National Staff Development Council (NSDC, 2001) states that the content of staff development should provide educators with "research based instructional strategies". The reason for this standard is eloquently expressed as follows: "*The charisma of a speaker or the attachment of an educational leader to an unproven innovation drives staff development in far too many schools. Staff*

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development in these situations is often subject to the fad du jour and does not live up to its promise of improved teaching and higher student achievement. Consequently, it is essential that teachers and administrators become informed consumers when selecting both the content and professional learning processes of staff development efforts." (NSDC, 2004).

These words, referring to professional developments apply just as well to all of the other decisions about curriculum, materials, and instructional methods in Business Education. The imperative for incorporating SBR is dictated not only by Federal law in an advanced nation like the United States of America, but by common sense as well. With budgets tighter and distinct demands greater in these advanced world economies, educators need to be able to evaluate the evidence for the effectiveness of costly programs and materials. SBR is the *"gold standard"* for such evidence (Coalition for Evidence-Based Policy, 2003). Therefore Business educators and other educators in Nigeria will need to care about SBR in order to improve learning in the classroom and integrate SBR into their educational *modus operandi*.

Definition of SBR by the No Child Left Behind (NCLB) Act

Scientifically based research is defined in the NCLB legislation as "research that involves the application of rigorous, systematic, and objective procedures to obtain reliable and valid knowledge relevant to education activities and programs" (NCLB, 2002). To begin, the point of SBR requirements is to ensure that government funds are being spent on "what works" – programs that are likely to make a strong impact on student achievement (Comprehensive School Reform Program Office (CSRPO, 2002). The issue now is; what sorts of research then constitute scientific evidence of effectiveness? When examining this questions, Feuer, Towne, and Shavelson, (2002) note that no method is good, bad, scientific, or unscientific in itself: Rather, it is the appropriate application of method to a particular problem that enable judgments about scientific quality.

The NCLB legislation, along with guidelines from the U.S. Department of Education, defines scientific research for the goal of determining what works in educational programs and practices. For example, scientific evidence for a vocational program would need to demonstrate convincingly that the program causes an improvement in the psychomotor domain or rather, the practicability of knowledge/skills acquired. The NCLB legislation describes six criteria for research that meets this lofty standard in the following discourse.

Criteria for scientifically based research (SBR)

The NCLB Act presents a detailed definition of SBR focused on six criteria as follows:

Research that employs systematic, empirical methods that draw on observation or experiment

The defining principle of scientific evidence is systematic empiricism. Empiricism is "watching the world", relying on careful observation of events to make conclusions (Stanovich and Stanovich, 2003:33). This view emphasizes that systematic empiricism requires doing those observations in a careful manner in order to answer a specific question. In the realm of educational research, systematic empiricism requires an exact definition of the intervention and program being studied and a careful measurement of its outcomes.

This criterion requires quantitative research, the hallmark of which is the use of numerical measurement of student outcomes. In order to know if one method truly caused an improvement, it is necessary to quantify the improvement in students' performances. For example, studies about the effectiveness of certain business and vocational instructional practices measured the improvement in vocational and business abilities, perhaps by quantifying changes over time in the percentage of vocational and business problems that students are able to respond to.

Research that involves rigorous data analyses that is adequate to test the stated hypotheses and justify the general conclusions drawn

Gaddy (2007) notes that it is necessary to analyze data from a study using appropriate statistical procedures that can support the conclusions. According to this view, failure to apply the appropriate statistical procedures calls the results into question. Stanovich and Stanovich remark that reputable research does not issue strong claims for the effectiveness of a program or practice based on modest differences or gains in students achievement. It is necessary to use statistics to determine whether the results were significant and important.

For example, research on the influence of class size on typewriting achievement compared the speed/accuracy abilities of students in typing labs with 12 to 15 students, to labs with 20 to 25 students. The students from the smaller lab classes scored higher on speed/accuracy achievement tests. The researcher calculated the statistical significance of this difference to determine whether it was likely that such a result could have been possible by chance.

A great deal of technical expertise is necessary to understand whether statistical procedures have been performed and reported adequately. Fortunately, the publication of research in reputable sources and the replication of the results by different researchers give the layperson some degree of confidence that the research claims are above boards. On a superficial level, quality research reports basic statistical information such as the following:

(a) Sample size and representativeness.
(b) Statistical procedures to interpret data: This is research that compares the effectiveness of an intervention almost always reports statistical tests such as t-tests or analyses of variances (ANOVAs).
A study lacking such information is unlikely to provide convincing proof of effectiveness.
(c) Supplementary descriptive statistics: Quality research provides numbers that describe the results, such as means and standard deviations.
(d) Significance: Statistical significance is expressed as the probability that the observed differences could have happened by chance. When this is very low (i.e., 05 or less), the results are deemed statistically significant.
(e) Effect size: According to (Coalition for Evidence-Based Policy, 2003), the effect size is a description of how large an effect the treatment had. It should be reported in real-world terms, such as percentage of students writing at or above a given number of words per minutes (w. p. m) in shorthand. The size of an effect according to this view indicates its importance. Some effects can be statistically significant, but of such a small magnitude that they are unimportant.

Research that relies on measurement or observational methods that provide reliable and valid data across evaluators and observers, across multiple measurements and observation, and across studies by the same or different investigators

Scientific research needs to use reliable methods of collecting data. A reliable testing instrument will give you the same result each time you use it on the same person or situation. Whenever a study evaluates students in a manner that relies on human judgment, as with assessments of writing ability, it is essential for the research to report inter-rater reliability, an index of how closely the different raters agree. Studies that rely on testing instruments typically establish test-retest reliability by administering it to the same group of people twice. The main point is that SBR documents the reliability of its procedures for data collection. Data about a particular outcome (e.g. Accounting, achievement) are valid if they truly reflect that outcome and not some unrelated factors.

Research that is evaluated using experimental or quasi-experimental designs in which individuals, entities, programs, or activities are assigned to different conditions and with appropriate controls to evaluate the effects of the condition of interest, with a preference for random-assignment experiments or other designs to the extent that those designs contain within-condition or across-condition controls

Experimental design is the criteria, which specifies that in order to be deemed scientific by the NCLB Act, research needs to conform to an experimental or quasi-experimental design. This reasoning is that it is difficult to understand the effectiveness of any educational approach without comparing it to a different approach. For this reason, this criterion states that evidence for the effectiveness of any practice needs to include a comparison group to show what would happen if that practice had not been used. NCLB notes that an ideal comparison group is similar in every important way that could influence the outcome of interest. Because the comparison groups allow researchers to control for the influence of external factors unrelated to the intervention, it is sometimes called a control group. By contrast, the group of people (or schools) that use the practice under investigation is typically called the treatment or experimental group.

This criterion makes an additional statement about comparison groups and treatment groups. The best way to assign people to these groups is through random process. Thus random assignment is the hallmark of the experimental design. It is noted however, that random assignment is not always possible, for both practice

and ethical reasons. Because of these concerns, most educational research (including researches in Business Education) does not utilize a pure experimental design, but rather a quasi-experimental design. One such approach is to select a comparison group that closely matches the control group in all relevant factors. Thus, a study of an intensive professional development program in say, Accountancy or Office Technology Management (OTM), might select five institutions to participate in the program and five other similar institutions to serve as comparison institutions. Although this sounds very much like an experiment, it lacks the key factor of random assignment, the institutions that received the program may have volunteered or been selected to participate.

For this approach to be considered SBR by NCLB measures, the five comparison institutions would need to closely match the treatment group in all the factors that could influence the intended outcome of the program (this include: demographic composition, academic achievement, and timing of evaluation (NCLB, 2003). It must be noted that this criteria has generated much controversy due to what some perceive as its exclusion of legitimate methods of scientific research such as qualitative designs and other none-experimental approaches.

Research that ensures that experimental studies are presented in sufficient detail and variety to allow for replication or at a minimum offer the opportunity to build systematically on their findings

Since a scientific research is supposed to be open to the public, it is held that a person who claims to have discovered an effective teaching technique needs to submit evidence for its effectiveness to public scrutiny. If the results are sound and the practice is truly effective, other people should be able to get the same results. For this reason, SBR must be reported in sufficient detail to allow for replication of the intervention and the scientific findings. One type of replication according to Krashen as cited by Gaddy (2007), involves practitioners reproducing the educational intervention in their own schools. Another type of replication according to this view is more demanding; it involves another researcher attempting to replicate the original findings by following the same research procedures. This is an important process because it allows researchers to independently confirm the legitimacy of purported scientific evidence. For this reason, scientific research also needs to include all of the details about the educational intervention, participants, materials, outcome measures (e.g. tests and questionnaires) and the statistical procedures that were employed. Vague reporting of methods or results according to Mid-Continent Research for Education and Learning (MCREL, 2009) is a red flag, because it makes it seem as if the authors have something to hide. By the same token, successful replication of the research from a variety of sources ensures that the research is truly objective.

For example, in the early 1990's according to National Clearinghouse on Comprehensive School Reform (NCCSR, 2009), Psychology Researchers published a study in which they claimed that listening to a Mozart Sonata temporarily boosted the IQ of College students. The results of this small study were reported widely in the popular media unleashing a torrent of marketing of classical music as a way to improve intelligence. Subsequent researchers have precisely replicated the methods of the original experiment, but have not replicated the findings of increased IQ. For this reason, the validity of the original findings is highly doubtful.

Research that has been accepted by a peer-reviewed journal or approved by a panel of independent experts through a comparably rigorous, objective, and scientific review

The process of peer review is essential to SBR. Many Journal of educational research, such as the American Educational Research Journal accept their articles based on the review of other researchers who understand the research topic. The purpose of peer review according to Marzano, Norford, Faymer and Pickering (2004), is to submit research to public criticism to shine the light of objectivity generated by independent minds. This process helps to screen out poor quality research, especially research that has serious problems in any of the areas discussed here. A variety of Journals – with varying degrees of stringency of standards exist, so peer review is a minimal standard. Yet because it is minimal, its absence is a sure sign that a particular method is lacking in quality (Stanovich and Stanovich, 2003). It is possible to determine whether a Journal is peer reviewed by reading the editorial policy for acceptance of manuscripts.

In summary, SBR is submitted to public scrutiny through peer review, and is replicated by independent researchers. Educators (including Business Educators) should therefore be wary of programs or practices

whose support comes only from unpublished "In-house" studies conducted by its commercial vendors (Coalition of Evidence-Based Policy, 2003).

Evaluating the Evidence-Base of a research

Having defined the general approach to SBR and having discussed different types of research questions, it is evident that we have also seen certain research designs as more qualitative than others. The tasks of evaluating the evidence-base is more complex however, than considering the quality of individual studies in isolation. Rather. Educators (including Business Educators) need to take into account three perspectives when weighing the evidence in favour of adopting a particular program or practice:

(1) The theoretical base of the reform practice or program.
(2) Implementation and replicability information, and
(3) Evidence of effects on student achievement (Comprehensive School Reform Office, 2002).

The Business Educator should therefore note the following identified questions to ask when judging the quality of implementation and replicability of SBR:

- How many schools have used this practice or program?
- Did the schools using it fully implement the practice or programme?
- In what settings has it been implemented?
- Has improved students achievements been convincingly demonstrated in a variety of settings?

CONCLUSION

From the foregoing, the Business Educator should have seen that gathering, synthesizing, and using SBR are the steps to making good decisions about educational programs, products and practices. Although, studying the evidence base is time consuming, proper consideration of SBR gives educators greater confidence in their decision-making and may lead to greater opportunity for students to succeed.

Decision makers in education should understand the importance of research. Just as leader in business and industry use research to improve their products and services, so too business educators should utilize research to inform their decisions about academic programs.

Administrators and teachers in business education programs should have a grasp on the fundamental principles of research. This will allow them to understand the strengths and limitations of the research behind a given school program or product. It is true that most academic leaders have neither the time nor training to offer expert critiques of educational research. This should be a serious challenge to planners of business education program.

It should also be noted that, if business educators understand basic concepts of research – such as comparison groups, measurement quality and replication – they would have the basic vocabulary to comprehend the critiques of those who are qualified to offer them. This will help academic leaders make more informed decisions about how to select the right programs and products for their schools (Gaddy, 2007).

RECOMMENDATION

Based on the foregoing, the policy action options for business educators therefore is that teachers, administrators and policy makers can team together and pursue the following Action Options to achieve their goal of using SBR to create the best educational opportunities for students. They should therefore:

- Learn and understand the meaning of SBR.
- Use trustworthy resources such as the "What Works Clearinghouse" to identify SBR that speaks to your local needs.
- Form a study group to search for appropriate research that deals with issues unique to your study. This approach is recommended because the task of examining research is time consuming. A study group is helpful in two ways as recommended by (CEBP, 2003) in the U.S Department of Education. That is, group membership shares the workload, and they diffuse the information throughout the organization. Educators can expect this process to extend over several months as they consider the competing claims of different programs and practices. The study group's activities may

- include similar academic institutions that have implemented the programs, and even inviting researchers to explain the program in question (NSDC, 2004).
- Ask critical questions about educational programs, products or services. Know how to discern quickly whether a program has any evidence of effectiveness or whether it relies solely on the testimonials of a few schools. Before committing to a program, consider the entire evidence base behind it: the evidence for its effectiveness, how the program relates to established theory, and whether it has been successfully implemented in institutions like yours.
- Continue to utilize professional wisdom to understand what programs and practices fit best with your students.
- Finally, consider eliminating programs or practices that are not evidence based.

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