Journal of Educations, Vol. 3 No. 1, October 2013, 1-7

IDENTIFYING EFFECTIVE EDUCATIONAL PRACTICES: A CALL FOR EVIDENCE-BASED EDUCATION

Editorial

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Education has a substantial impact on both individuals and society. For example, education helps reduce poverty (UNESCO, 2011), improve the health of young children (UNESCO, 2011), reduce the rate of HIV infection (Pettifor, Levandowski, MacPhail, Padian, Cohen, & Rees, 2008), and fosters peace in the community (UNESCO, 2012). In light of this, providing a high quality education is a key goal of the Nigerian government (Federal Republic of Nigeria, 2004).

Most of the scholarly and popular discourse on improving education in Nigeria focuses on infrastructure and learning materials (see Jaiyeoba, 2007; Oghenevwede, 2011 for scholarly articles; Edukugho, 2013; Udom, 2013 for popular articles). However, Hattie (2003) provided evidence that infrastructure and appropriate materials only contributes about 5-10% to students' academic performance. "The discussion on the attributes of schools – the finances, the school size, the class size, the buildings are important as they must be there in some form for a school to exist, but that is about it" (Hattie, 2003, p. 2). On the other hand, Hattie reported that high-quality teaching contributes about 30% to students' academic performance. "It is what teachers know, do, and care about which is very powerful in this learning equation" (Hattie, 2003, p. 2). In other words, what goes on inside the classroom is more important to the quality of education than the facilities.

Evaluating the quality of educational facilities is rather straightforward and can be done by answering two questions. Are the facilities available? Are the facilities well maintained? However, evaluating the quality of teaching practices is not as simple. This is perhaps one reason why infrastructure is generally the focus of educational discourse: it is easy to evaluate the quality of infrastructure, whereas evaluating the quality of teaching practices is considerably more difficult.

Government is largely responsible for improving infrastructure. On the other hand, we as educators may be implicated if the quality of teaching practices is evaluated. If the quality of teaching practices is found to be sub-standard, then educators are the ones who will be required to change for the quality of education to improve. Blaming Government for not providing infrastructure is much easier than considering how we can improve our teaching practices.

Indeed, much of what goes on inside the classroom is the product of tradition: this is how my teachers taught me, so this is how I will teach my students. We assume that these traditional practices are effective because that is what has always been done. However, this is often not true. Alternatively, we may think that educational practices that are more

expensive must be better: teaching with computers costs more than teaching with a blackboard, so teaching with computers must be more effective. However, this also is often not true. Thus, an important question to ask is: How are educators to evaluate teaching practices to determine which are most effective?

Evidence-Based Education

A new movement in education, called evidence-based education, is attempting to improve the quality of education through educational research. According to evidence-based education, stakeholders use empirical research to evaluate and make informed decisions in selecting the best educational interventions, such as teaching practices, counseling programs, and educational policy (Wing Institute, 2013). By using empirical evidence to select the best educational practices, teachers and other stakeholders can use educational strategies that foster the best learning outcomes.

Simply, the basic goal of education is to promote student learning. Therefore, everything that happens in a school should work toward achieving this basic goal. There are always multiple strategies for accomplishing one goal. However, the best strategy is that which meets the goal most effectively and efficiently. In other words, there are many strategies for teaching mathematics. Teachers should choose the strategy that results in the best mathematical performance by students. Likewise, there are many strategies that can be used to counsel erring students. Counselors should use the counseling program that makes the greatest reduction in student misbehavior. Therefore, to answer the question posed above, "How are educators to evaluate teaching practices to determine which are most effective?" evidence-based education would say that the most effective teaching practices are those that have empirical research evidence to support that they improve student learning.

This is the essence of evidence-based education: teachers, counselors, principals, and parents should use educational practices that lead to the best educational outcomes. To determine the best educational outcomes, experimental research must be conducted to compare competing teaching practices. The most important educational outcome is academic performance. Thus, when choosing between multiple strategies for instruction, teachers should choose the strategy that leads to the highest academic performance.

However, academic performance is not the only important educational outcome. Another important educational outcome is intrinsic motivation, because students who have intrinsic motivation, or interest in a subject, tend to have better mastery of a subject, have better study practices, and internalize positive attitudes related towards the subject (Deci, Ryan, & Williams, 1996). Therefore, teachers should also choose teaching strategies that have evidence to support that they improve students' intrinsic motivation.

Second, how students approach their learning is another important variable in education (Eggen & Kauchak, 2004). Sometimes students will engage in surface learning, which means they only study a topic well enough to be able to pass the exam. These students memorize just enough information to be able to pass the class. However, this will not help students develop useful skills and knowledge that they can use when they finish school. Instead, teachers should focus more on helping students develop deep

understandings of the content. Students who take a deep approach to learning actively seek to understand the material, study beyond the requirements for the class, and have a much more thorough understanding of the content. Students who engage in deep learning generally can apply what they have learned to problems and situations outside of the classroom, which is a much more meaningful goal for education than simple memorization of information.

According to evidence-based education, educators should choose educational strategies that improve academic performance, deep learning of the content, intrinsic motivation, and other important educational outcomes. However, how are educators supposed to know which teaching practices improve these valuable learning outcomes? This is the primary goal of experimental educational research: to determine whether an educational program causes a change in learning outcomes.

Experimental Educational Research

Consider an analogy. Athletes want to know which training program leads to the best athletic performance. Let's say that a trainer establishes a new 30-minute workout that is supposed to improve a runner's speed. To determine whether this 30-minute workout indeed improves running speed, an experiment will be conducted: a group of runners will follow the new 30-minute workout for a month, while another group of runners will use the traditional workout for that same month. At the end of the month, all of the runners will compete in a race. If the group of runners who completed the new 30-minute workout run faster than the group of runners who completed the traditional workout, then it can be concluded that the new 30-minute workout is indeed superior to the traditional workout. As a result, athletes should switch to the new 30-minute workout if they want to improve their running speed.

Likewise, educators should conduct experimental research studies to evaluate the quality of teaching practices. For example, examination malpractice is a widespread problem in many educational institutions. One strategy that has been suggested to reduce examination malpractice is to spend one lesson discussing examination malpractice, then having students sign an "Honesty Pledge" where they agree to avoid examination malpractice. To determine whether this strategy is effective, an experiment can be conducted: a group of students are assigned to a group that signs the Honesty Pledge, while another group of students receive the typical intervention for examination malpractice. (In most schools, this is probably nothing.) After some time has passed, then students will be assessed on examination malpractice, perhaps by reporting how much examination malpractice they have engaged in, or reporting their willingness to engage in examination malpractice in the future. If the group who signed the Honesty Pledge reports lower examination malpractice, then this intervention will be deemed effective and teachers should adopt the Honesty Pledge to reduce examination malpractice in their schools.

However, when planning this experiment, there are a few factors that should be considered before the experiment is conducted. First, it is important that the two groups – the group of students who sign the honesty pledge and the group of students who receive the typical intervention for examination malpractice – are identical at the start of the

study. If the group of students who sign the honesty pledge has a higher rate of examination malpractice before the study begins, then any differences in examination malpractice between the two groups at the end of the study cannot be linked to the honesty pledge. Instead, the differences between groups on examination malpractice at the end of the study were likely due to differences between the two groups at the start of the study. Therefore, it is absolutely vital that the treatment and control groups in an experimental study are identical at the start of the study.

There are two strategies that can be used to ensure that the two groups are identical at the start of the study. The first is random assignment of participants into the treatment and control groups. This means that first, all of the individuals who will participate in the study are identified, and the names of all of these participants are put in a hat. The first name that is drawn goes to the treatment group, the next name goes to the control group, the third name goes to the treatment group, and so on. The rationale for random assignment is this: there are many factors that contribute to examination malpractice, such as honesty, knowledge of the subject, motivation to study, and peer pressure to cheat. However, when random assignment is used, it is assumed that these factors will balance each other out. In other words, one group might be more honest, but have less motivation to study. "By virtue of random assignment, individual characteristics or experiences that might confound the results [of the study] will be about evenly distributed between the groups" (Singleton & Straits, 2010, p. 197). Therefore, scholars agree that if random assignment is used, then the two groups are considered equal at the start of the study. Thus, at the end of the study, if the treatment group has better performance, researchers can say that better performance is due to the treatment.

Sometimes, however, random assignment cannot be achieved due to practical limitations in the study. If this is the case, then a pre-test should be given to both groups. The purpose of the pre-test is to get a baseline measure of differences between groups at the start of the study. Therefore, individuals in the treatment group and the control group should already be identified before the pre-test is given. The steps in this type of study is as follows: assign the participants to the treatment and control groups, administer the pre-test, give the treatment/control programs, and then administer the post-test. Then, after the post-test is given, statistical procedures can be used to adjust the post-test scores based on any differences in the pre-test scores, typically with an Analysis of Covariance (ANCOVA).

It is inappropriate to purposely create two different groups in an experimental research study. For example, imagine a study trying to determine whether a counseling programme is effective for improving students' study skills. In this study, researchers create two groups that are clearly different at the start of the study: the treatment group has poor study skills and the control group has good study skills. The rationale may be that the treatment group needs the counseling whereas the control group does not. However, this is a poor research design because the two groups are clearly not equal at the start of the study. In essence, the treatment and control groups have two entirely different populations: the treatment group population has poor study skills, whereas the control group population has good study skills. This is very problematic for research design. At the end of the study, are difference between the treatment and control group because of the treatment, or because the two groups were different at the start of the

study? If the two groups are different at the start of the study, there is no clear way to answer this question. This is why the treatment and control group must be equal just before the treatment is given.

There are two procedures to fix this problem. First, all students, both those with good study skills and those with bad study skills, can be randomly assigned to the treatment and control groups. Thus, both groups will have a mixture of students with both good and bad study skills. A second procedure to fix this problem is to redefine the target population to include only students with poor study skills. Thus, all students with good study skills will be excluded from the study entirely. Only students with poor study skills will be randomly assigned to the treatment and control groups. In other words, both the treatment and the control groups will both have poor study skills.

To summarize, to complete an experimental research study, there are three conditions that must be met.

1. The treatment and control group must be identical at the start of the study. There are two procedures that can be used to achieve this. The first procedure is to randomly assign all participants to the treatment and control groups. The second procedure is to use pre-existing groups, but give a pre-test to measure any differences between the groups at the start of the study and use an ANCOVA to adjust the post-test scores based on any differences in the pre-test. The first procedure of random assignment is generally preferable.
2. The treatment and control groups must be treated equally throughout the entire study, with the only difference between the groups being that the treatment group gets the treatment whereas the control group does not.
3. Both groups must be measured on the exact same post-test after the treatment is finished.

At the end of the study, the researcher can conclude that the treatment was effective if and only if the treatment group out-performed the control group on the variable of interest. Sometimes, there will be no differences between the treatment and control group at the end of the study on the variable of interest. For example, the treatment and control group had statistically identical scores on the post-test for study skills (meaning that the t-test, ANOVA, or ANCOVA was not significant). If this is the case, then the treatment was not effective because the treatment group had the same scores as the control group at the end of the study. Again, evidence-based education is based on the philosophy that the best educational strategy is the one that leads to the best performance amongst students. If the treatment group is identical to the control group at the end of the study, then there is no evidence to conclude that the treatment was effective because the treatment group had the same performance as the control group. In some research studies, the control group outperforms the treatment group on the key variable of interest. This means that the treatment was actually worse than the traditional method of teaching.

The only way to conclude that the new educational programme is effective is if the treatment group has statistically significant higher scores than the control group at the end of the study. This is the heart of evidence-based education: if the treatment group out-performs the control group, then we have evidence that the new educational programme

is effective. However, if there is no difference between the treatment and control group, or if the control group out-performs the treatment group, then the new educational programme is not effective: there is no evidence to support that the new educational program leads to better student performance.

CONCLUSION

In conclusion, the quality of education in Nigeria will improve if educators improve the quality of their teaching practices. The quality of teaching practices is currently determined by two sources: either by tradition, those educational practices that have been used in the past, or by authority, those educational practices that have been recommended by educational experts. However, neither of these sources have clear evidence to support that they are, indeed, effective teaching practices.

Evidence-based education means that educational interventions should be evaluated using educational research to gather concrete evidence about whether they are effective in improving educational outcomes (Wing Institute, 2013). In other words, the best way to determine which teaching practices are most effective is by conducting educational research, which explicitly compares different teaching practices to determine which is most successful on improving educational variables of interest. If the evidence supports the teaching practice, meaning that the students who receive that teaching practice outperform the control group based on statistical analyses, then that teaching practice should be adopted by educators.

Evidence-based education has implications for both educators and educational researchers. First, teachers, counselors, and principals should evaluate their own educational practices to determine if they are providing a high-quality education for their students. Teachers have the most powerful role to play in providing a high-quality education. Second, educational researchers must start conducting more high-quality experimental research that compares teaching practices to determine which is most effective. Educational research can establish the most effective practices that teachers, counselors, administrators, and students can use to improve learning outcomes by collecting scientific data about important topics in education. Using teaching practices that have proven to be effective by educational research will improve the quality of education in Nigeria.

REFERENCES

Deci, E. L., Ryan, R. M., & Williams, G. C. (1996). Need satisfaction and the self regulation of learning. *Learning and Individual Differences, 8,* 165-183.

Edukugho, E. (2013, August 31). Nigeria: No headway as ASUU battles govt over extra allowances, funding. *Vanguard*. Retrieved from http://allafrica.com/stories/201309020063.html

Eggen, P., & Kauchak, D. (2004). *Educational psychology: Windows on classrooms* (6th ed.). Upper Saddle River, NJ: Pearson.

Hattie, J. (2003, October). *Teachers make a difference: What is the research evidence?* Paper presented at the Australian Council for Educational Research Annual Conference in Building Teacher Quality, Melbourne. Retrieved from http://www.acer.edu.au/documents/hattie_teachersmakeadifference.pdf

Federal Republic of Nigeria. (2004). *National policy on education.*

Jaiyeoba, A. O. (2007). Perceived impact of Universal Basic Education on National Development in Nigeria. *International Journal of African and African American Studies, 6,* 48-58. Retrieved from https://ojcs.siue.edu/ojs/index.php/ijaaas/article/viewFile/89/149

Oghenevwede, O. E. (2011). An investigation into the state of resources for effective teaching of the sciences in Delta state secondary schools. *Benin Journal of Educational Studies, 20,* 124-134.

Pettifor, A. E., Levandowski, B. A., MacPhail, C., Padian, N. S., Cohen, M. S., & Rees, H. V. (2008). Keep them in school: The importance of education as a protective factor against HIV infection among young South African women. *International Journal of Epidemiology, 37,* 1266-1273.

Singleton, R. A. Jr., & Straits, B. C. (2010). *Approaches to social research* (5th ed.).New York: Oxford University Press.

Udom, A. (2013, August 15). Nigeria: Expert blames Nigeria's low quality education on infrastructural decay. *Leadership (Abuja).* Retrieved from http://allafrica.com/stories/201308150567.html

UNESCO. (2011). *Education counts towards the Millennium Development Goals.* Retrieved from http://unesdoc.unesco.org/images/0019/001902/190214e.pdf

UNESCO. (2012, September). *International literacy day.* Retrieved from http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/ED/pdf/NotesLiteracy-Peace.pdf

Wing Institute. (2013). *What is evidence-based education?* Retrieved from http://winginstitute.org/Evidence-Based-Education/what-is-evidence-based-education/