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*Online Learning and Teacher Education:
Knowledge Acquisition, Application Skills, and Reported Confidence*

Executive Summary

Two studies are reported here that demonstrate superior performance of college students after the use of free, online instructional Modules, produced by the IRIS Center (U.S. Department of Education Project #H325E120002). When compared to traditional teacher education methods, IRIS Modules yield better outcomes in terms of knowledge acquisition, application skills, and confidence in the use of evidence-based practices (EBPs). IRIS instructional Modules are grounded in John Bransford's *How People Learn* theory (Bransford, 2009; Bransford, Brown & Cocking, 2000). They are delivered through the IRIS Center's barrier-free Website (www.iriscenter.com) at no cost to users.

Rationale

Worldwide, several important factors are systemically changing the education enterprise. First, the inclusive education initiatives outlined in the Individuals with Disabilities Education Act in the United States and in the UN Convention on the Rights of Persons with Disabilities in Europe have resulted in more and more students with special needs being educated in general education classrooms (German Commission for UNESCO, 2013; IDEA Data Center, 2014). Second, we now know that teachers' skills account for the largest variance in student achievement compared to all other school factors (Organization for Economic Co-Operation and Development [OECD], 2005). Both in the United States and in Europe, acknowledgement is growing about the important role teachers play in the success of their students, particularly those learning in inclusive settings (European Agency for Development of Special Needs Education, 2010).

Schools and teachers increasingly are being held accountable through standardized assessments and measurable outcomes of students' performance. In the United States, public policy expressions related to these growing accountability standards are found in laws (e.g., the Elementary and Secondary Education Act [ESEA, PL 107-110], the Individuals with Disabilities Education Act [PL 108-446], policy statements of professional organizations (e.g., American Federation of Teachers [AFT], 2012), criteria used by teacher education accrediting agencies (National Council for Accreditation of Teacher Education [NCATE], 2010), and in the professional literature (Coggshall, Bivona & Reschly, 2012; Greenberg, McKee, & Walsh, 2013).

Finally, in recent years there is a growing sense that U.S. teacher education programs should be accountable for the success of their graduates. In 2013, the National Council for Teacher Quality (NCTQ) released a report indicting almost all U.S. teacher education programs for failing to produce effective teachers (Greenburg et al., 2013). At the heart of the problem, NCTQ claimed, was the lack of evidence-based practices (EBPs) being incorporated into teacher education curricula. However, the issues are far more complex. It is not sufficient to simply present information about EBPs to teacher education candidates; rather, programs must ensure not only that they master knowledge but also that they feel confident and apply EBPs in educational settings (i.e., field experiences, internships, student teaching).

Therefore, studies about the effectiveness of IRIS Modules, which are delivered online, on knowledge acquisition and performance in applied settings of teacher candidates are critical to the IRIS Center's foundation. The results from such studies are also important to teacher educators

who are charged with the responsibility of producing effective teachers and needing to know whether the methods they use in teacher education pedagogy are effective.

Background

The IRIS Center develops, produces, and makes available instructional Modules about EBPs that improve academic and social performance of all learners struggling in inclusive classroom settings, particularly those with disabilities. To date, the IRIS Center disseminates 55 instructional Modules—19 of which have been translated into Spanish—and 15 Case Studies—of which 5 have been translated into Spanish—are supported by hundreds of other resources. The 2013 calendar year saw almost 1.1 million users, over 41,000 of them came from countries other than the United States. Over 76% of all special education teacher education programs in the United States have incorporated IRIS resources into their coursework.

Study 1

College students' increased *knowledge* about making accommodations for students with disabilities in inclusive settings. Through a tightly designed series of studies, learner-outcomes from Module-use were tested and proven effective at the .001 levels of significance when compared to learning from a textbook and three instructors' lectures. Over 300 non-special education majors enrolled in one of three large sections of Introduction to Special Education served as subjects.

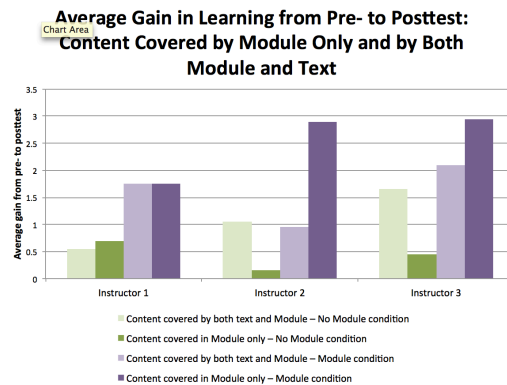


Figure 1. Learners' knowledge acquisition outcomes: Pre- and post-test means.

These students also were asked to respond to a hypothetical scenario that tested their abilities to apply the knowledge learned through the IRIS Module. In every case, the post-test score of students who worked through the Module were significantly higher than for students who learned through traditional teacher education approaches (e.g., lectures and textbook content). A large, average effect size (1.08) was achieved. Data from this phase of Study 1 is shown in Figure 2.

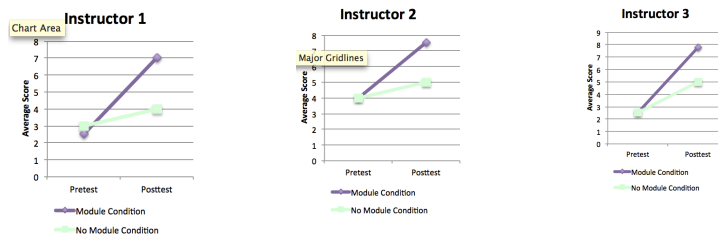


Figure 2. Average effect sizes for pre- and post-test scores from scenario answers for students who worked through the IRIS Module and those who did not (average effect size difference = 1.08).

Study 2

This study compared the use of the IRIS Module about functional behavioral assessments (FBAs) and traditionally delivered (lecture-based) college instruction on the same topic. Two indicators of learning were assessed: conceptual application of knowledge and confidence regarding the ability to apply the EBP in practice.

Teacher candidates completing their special education teacher preparation program at a large urban university enroll in practicum as their culminating experience. These students are required to take a companion training series. Pre- and post-tests showed increased confidence ($p = .018$) in those who used the IRIS Module about implementing FBA. Confidence was measured using an 8-item Likert-type scale.

These candidates also completed pre- and post-tests for conceptual application of knowledge, which was measured using the assessment questions found in the Module. Pre-service teachers who used the IRIS Module scored significantly higher ($p = .015$) on the conceptual application of knowledge measure ($M = 19.29$, $SD = 4.86$) than those who participated in the lecture-only condition ($M = 13.33$, $SD = 3.45$). Furthermore, the effect of using the IRIS Module was large ($d = 1.41$).

Discussion

The premise of the IRIS Center's work is that *all* education professionals working in inclusive settings must be well prepared to meet the educational needs of *all* students. Unfortunately, educators consistently report that they feel inadequately prepared to meet the learning needs of those who struggle to meet proficiency with basic academic skills (Burns & Yssledyke, 2009; Cook et al., 2007, 2009). General and special education teachers are not sufficiently knowledgeable about research-validated methods (Coggshall et al., 2012; Jones, 2009) and do not use these practices. Addressing these issues will require multiple innovative and effective approaches to initial teacher preparation and professional development so that all teachers of all students who struggle with the general education curriculum, specifically those with learning disabilities, are armed with sufficient knowledge about EBPs. The results from these studies show that Web-based technology, as employed by the IRIS Center, is one vehicle that can be used with confidence.

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