Evidence-Based Practice in Kinesiology: The Theory to Practice Gap Revisited

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Abstract

As evidence-based practice sweeps the applied health professions, it is a good time to evaluate the generation of knowledge in Kinesiology and its transmission to professionals and the public. Knowledge transmission has been debated in the past from the perspectives of the theory-to-practice gap and the discipline versus profession emphasis. Although there has been an increase in research reported in many Kinesiology and allied health journals, there remain several problems in creating and transmitting knowledge that can be applied in professional practice. For the public to take the Kinesiology professions seriously as movement experts, Kinesiology in higher education and Kinesiology professionals, like physical educators, must improve in three areas: increasing the acceptance and funding of applied research, increasing the acceptance and funding of interdisciplinary research, and the creation of integrated and accessible research summaries for professionals and the public.

Key words: research, review, meta-analysis, profession

Physicians interested in promoting health through physical exercise founded the field of physical education in the United States about one hundred twenty years ago. Since there were few physical education programs in higher education at the time, many of the physical directors in YMCA's and schools came from former students of the various traditions of gymnastics. Some physical directors taught during the school year and studied the new field of physical education during the summer. Since theory and practice in American physical education were in the early stages of development, there was little concern for a theory-to-practice gap. A gap, however, has emerged (Locke, 1969) and has been widening ever since.

From the beginning of American physical education, professors conducted applied research on the causes and effects of their exercise and sport programs (Massengale & Swanson, 1997). Much of the research in the first half of the twentieth century focused on measuring strength and motor skill, cardiovascular adaptations, and the neuromuscular control of human movement. Many physical education scholars had research interests that related to the teaching of movement skills. For example, Ruth Glassow conducted research that could be applied in improving the teaching and learning of motor skills. Many of her ideas like specific educational objectives, evaluation strategies, and biomechanical skill components were decades ahead of when they became prominent in educational circles (Widule, 1980). The genesis of a theory to practice gap, however, was simultaneously brewing.

One of the primary social forces in the early twentieth century was the rapid adoption of sport and athletics. This was assimilated into the identity of physical education. This alliance with sport, however, has contributed to an academic legitimacy crisis for physical education in higher education.

In the latter half of the twentieth century, several trends in higher education tended to increase the rift between the development of theoretical knowledge in Kinesiology and the application of knowledge in the professions. For the purposes of this paper, the careers of Kinesiology majors will be referred to as professions, although teaching and many allied health careers

are not true professions (Etzioni, 1969). First, the founding academics of Kinesiology with applied research interests retired. The second trend that was very influential was threats to physical education in higher education that tended to increase the emphasis on research and the academic discipline movement in physical education (Henry, 1964). The use of kinesiology as the predominant term for our field today is a result of this trend. Third, the formal recognition and rapid growth of several subdisciplines in kinesiology led to increased specialization. This reductionism in kinesiology research and budget cuts in higher education also contributed to the debates about the terminology, structure, and body of knowledge for Kinesiology in American higher education (e.g., Corbin & Eckert, 1990; Greendorfer, 1987; Hoffman, 1985; Renson, 1989, 2001; Thomas, 1987; Zeigler, 1990).

These trends have exaggerated the gap between the academic discipline and professional practice roles in Kinesiology, and contributed to the theory-to- practice gap between the researchers in higher education, the professionals in the field, and the public. The next section will note current problems in the generation and transmission of knowledge in Kinesiology that have been created by these trends. The last section of this paper will suggest strategies for Kinesiology to adopt to narrow the theory-to-practice gap and begin to move our field more toward evidence-based practice.

Problems Contributing to a Theory-to-Practice Gap

The current gap between Kinesiology research and professional practice in the field is primarily influenced by three factors. First, there is a genuine lack of applied research in many kinesiology journals. Second, there is very little interdisciplinary research. Finally, there are few efforts to provide comprehensive, evidence-based reviews of research that integrate the large body of knowledge in Kinesiology and related fields.

Lack of Applied Research

The first problem is a lack of meaningful, applied research documenting the outcomes of exercise and sport interventions. Research can be viewed as a continuum between applied research and basic or pure research. The quest for academic prestige and tenure for Kinesiology faculty has encouraged theoretical research focused on mechanisms of adaptation. Many of the most prestigious journals in Kinesiology are openly or quietly hostile toward applied research. The author instructions for the *Research Quarterly for Exercise in Sport* say that papers are published that contribute to "knowledge and the development of theory" (RQES, 2004) and make no mention of value for applied research on real- life outcomes of physical activity programs.

It is dangerous academic snobbery to clearly emphasize theoretical research over applied research. Journal editors and reviewers mean well, but failing to value applied research has adverse consequences for the field. As major discoveries in applied research in physical activity are made in other allied health fields (e.g. fitness boom of the late 20th century, associations between physical activity and morbidity/mortality, and the current epidemic of obesity and diabetes), it appears that Kinesiology faculty are on the sideline and not major players in addressing these health issues. While it is true that applied and prospective research on the response of humans to exercise is open to confounding factors, results of these studies are more realistic and clearly benefit the field more than a small step toward a particular theory. These applied studies also provide support for Kinesiology professions at the table when public health policies and programs are debated.

In this absence of clear outcomes research, documenting the effectiveness of services of the Kinesiology professions, there has been a continual erosion of support for the Kinesiology undergraduate and graduate programs. The high esteem placed on basic research focusing on

health and physiological mechanisms of exercise adaptation and theory over applied outcomes research has likely hurt sport sciences (Stone, Sands, & Stone, 2004) and physical education (Renson, 2001) in the United States. In the future, political powers will be requiring of Kinesiology programs greater evidence of the effectiveness of our graduates in effecting positive outcomes with clients. Our neglect of applied research for evidence-based practice will continue to leave us in a vulnerable position.

A key tenet of the evidence-based practice is that the strengths and weaknesses of all the evidence should be weighed in arriving at consensus on what is appropriate professional treatment of individual clients. While there is a generally accepted hierarchy of evidence in evidence-based medical practice (Bithell, 2000; Hadorn et al. 1996; Sackett et al., 1996) and tools for weighing evidence to treat clients (Ebell et al. 2004), there is some controversy about this trend (Di Fabio, 1999; Balsor et al. 2000). Figure 1 illustrates a possible hierarchy for weighing evidence for practice in Kinesiology professions. Note that the clinical/applied studies are weighted higher than basic research. Professional experience should play a role in planning exercise programs, but it is placed at a lower priority than applied research. It is currently difficult for Kinesiology professionals to use research to support their practice with the lack of applied research in the field.

Lack of Interdisciplinary Research

Since human movement performance and injuries are influenced by many factors, interdisciplinary research is likely to yield results most applicable to professional practice. An interdisciplinary approach involves a true integration of Kinesiology subdisciplines (Burwitz, Moore, & Wilkinson, 1994; Ziegler 1990) rather than multiple, isolated perspectives from several subdisciplines. Unfortunately, a lack of interdisciplinary research in Kinesiology (Burwitz, Moore, & Wilkinson, 1994; Harris, 1993; Martens, 1991) is the second problem in the theory-to-practice gap.

Kinesiology faculty are typically trained to perform research in narrow subdisciplinary areas. Most faculty have few rewards to try collaborative and interdisciplinary studies, nor are there publication outlets for such research. Kinesiology has had two journals for publishing interdisciplinary, applied papers (*Motor Skills: Theory into Practice, Journal of Interdisciplinary Research in Physical Education*) but they ceased publication within a couple of years after their founding. A Kinesiology faculty member conducting interdisciplinary research would likely find most Kinesiology journals and reviewers unfamiliar or even unfriendly toward such projects.[1]

Another example of a lack of interdisciplinary thinking in Kinesiology is the development of qualitative analysis scholarship. Qualitative analysis of human movement is a critical skill for Kinesiology professionals who must integrate many subdisciplinary bodies of knowledge (Knudson & Morrison, 2002). This larger vision of qualitative analysis or clinical diagnosis (Hoffman, 1983) has been difficult to infuse in the Kinesiology curriculum and the research in this area. Professional journal papers and research articles continue to perpetuate outdated terminology, as well as simple observe and correct models of analysis (Morrison, 2004; Reeve, 2000) despite a considerable history of scholarship in this area (Knudson & Morrison, 2002).

The specialization of graduate education and research in Kinesiology has contributed to the lack of interdisciplinary research. It is much easier for young faculty to design restricted studies testing subdisciplinary theories or mechanisms of movement behavior, than to design and publish realistic, interdisciplinary studies documenting the effectiveness of physical activity and exercise

1. The author recently submitted an interdisciplinary study to a well-known journal for review and suggested potential reviewers with experience in the area. It is interesting to note that since there was no clear subdiscipline to assign the paper to, the anthropometrics section editor was assigned to supervise the review.

programs. While the latter is more meaningful to designing and justifying professional practice in Kinesiology, it runs a higher risk of rejection in current Kinesiology journals. Few Kinesiology faculty will endanger their tenure and promotion to explore interdisciplinary research and scholarship.

Lack of Integrated and Accessible Reviews

Another problem is the lack of integrated and accessible reviews of the literature for Kinesiology professionals (Martens, 1991). Professional practice should be based on an integration of experience and research, but there are few places professionals can access comprehensive reviews of the latest research. Several authors have commented on many aspects of this problem like professionals avoidance of research (Graham, 2003; Lawson, 1992; Locke, 1969; Martens, 1991; Maher et al. 2004; Rothsetin, 1973; Stadulis, 1973). Others have developed resources to help professionals read and apply research in professional practice (Locke & Lambdin, 2003; Locke, Silverman, & Spirduso, 1998), but I believe the primary factors limiting the theory to practice gap may currently reside in higher education, scholarly and professional societies.

Like the nightly television news, several Kinesiology publications and societies provide research abstracts of recent research from other primary sources. The *Physical Activity Today* published by the Research Consortium of AAHPERD is little more than a newsletter of abstracts. These short summaries typically do not evaluate the research, and more importantly, do not integrate the rest of the body of knowledge to provide recommendations for professional practice. This perpetuates an incorrect understanding of the rules of evidence and how scientific knowledge is constructed. Abstracting also does not illustrate the integration of sources necessary for evidence-based professional practice. One study never "proves" anything and Kinesiology knowledge and human movement are contextual, so critical reviews of a body of literature are needed to create general guidelines for professional practice.

Unfortunately, very few publications exist that provide comprehensive reviews of the body of literature in Kinesiology, with fewer still that integrate this knowledge with an emphasis on application. For example, the American College of Sports Medicine review journal, *Exercise and Sport Sciences Reviews*, now (since 2000) focuses only on short reviews. Most of these short reviews have focused on specific mechanisms of exercise adaptation. Only the *President's Council on Physical Fitness Research Digest* provides comprehensive reviews of research on major professional issues in Kinesiology that are also easily accessible (www.fitness.gov/pcpfs_research_digs .htm) to professionals.

Also contributing to this poor integration of research into practice is the low quality of research integration in professional journal articles. Most articles in Kinesiology professional journals do not include citations supporting the recommendations made. The author instructions for many of these journals, in fact, discourage authors from appropriate citation of supporting references. The *Journal of Physical Education, Recreation and Dance* (JOPERD) author instructions focus more on writing issues ("simple," "straightforward," and "keep paragraphs short") than critical review of the evidence (JOPERD, 2004:22).

Hope for shrinking the theory to practice gap and erosion of political support, however, is not lost as there are success stories in these three areas that Kinesiology can adopt and implement. If we take steps to create and disseminate meaningful applied research the Kinesiology professions will continue to improve. I believe that Kinesiology professionals and many health or performance-conscious people will be receptive to our efforts to link research to practice. Many people search the Internet for health and exercise information despite the large percentage of web sites that present incorrect or incomplete information.

Strategies to Improve Evidence-Based Practice in Kinesiology

The three theory-to-practice problems identified that limit the creation and application of Kinesiology research can also be viewed as opportunities for change. This section outlines three strategies that can be implemented to help improve evidence-based practice in the Kinesiology professions.

Elevate the Status of Applied Research

An important first step in decreasing the theory-to-practice gap is the promotion of applied research in Kinesiology. As long as applied research enjoys second-class status in academe and prominent Kinesiology journals, there will be little meaningful, applied research that will answer key questions about professional practice. Overemphasis of theoretical research in Kinesiology is holding back the field. Kinesiology needs to adopt more applied research to fit into the evidence-based practice world of applied health and education we are now living in.

This is not a call to elevate applied research over pure research. The dangers of this approach are well known and often taught in graduate education (Biddle, 1997) using the chaos in the brickyard fable (Forscher, 1963). The Kinesiology field would be better served if a balance of applied and theoretical research were achieved. Where research is supported by Kinesiology societies or foundations, the guidelines for funding should ensure equal consideration between basic and applied research.

The reality is that quality theoretical and applied research can coexist, compliment each other and benefit the professions. Two examples of journals that encourage the publication of original, applied research and require sections on the implications of the research are *Sports Biomechanics* and the *Journal of Strength and Conditioning Research* (JSCR). Both journals have high standards and article rejection rates, but solicit applied research in Kinesiology.

Other journals in Kinesiology can encourage applied research and support evidence-based practice without a drastic redirection of their mission. Journals could increase acceptance of quality applied research studies, possibly by creating a review section devoted to applied research. Journals could also increase the number of invited reviews of the literature, focusing especially on areas of research where enough progress has been made to make evidence-based recommendations. These small changes in the philosophies of Kinesiology journals and in higher education may be difficult, but they are not impossible. This is why it is essential that faculty and professionals be strong advocates for equal treatment for applied research in journals supported by their societies.

Encourage Interdisciplinary Research

Another strategy to shrink the theory-to- practice gap is to create and sustain *some* emphasis on interdisciplinary research. Interdisciplinary research more closely matches the real-world environment of practice in the Kinesiology professions. It is unlikely that most Kinesiology journals will dramatically change their mission, but Kinesiology faculty and professionals should lobby the societies that support journals to include a section focusing on interdisciplinary research.

Having a publication outlet for interdisciplinary research will encourage faculty to work with other subdisciplines and professionals in designing meaningful, applied research. As governments and third party payers demand more accountability for outcomes and treatments, prospective and comprehensive studies of the effects of sport and exercise programs will be invaluable in improving the Kinesiology professions. Kinesiology professionals believe they provide valuable services, and interdisciplinary research is more likely than basic research will document the validity of these beliefs. With increased interdisciplinary research on the outcomes of physical activity programs there will be, hopefully, better arguments for

supporting Kinesiology and human movement professions.

Provide Integrated and Accessible Research Summaries

Arguably, the largest barrier facing Kinesiology professionals in accessing the latest knowledge to integrate into their practice involves time. Planning, working with clients, and documenting outcomes leaves little time to search the bewildering variety of journals for articles relevant to professional practice or the unique characteristics of particular clients. The field of Kinesiology must find a way to integrate theoretical and applied research into reviews for professionals, and these reviews have to be made easily accessible. Increasing the emphasis on this scholarship of integration (Boyer, 1990; Martens, 1991; Metzler, 1994) in Kinesiology will have a positive impact on bringing research into practice.

The outlets where more research summaries are needed are in scholarly, professional, and lay publications. The difficulties in creating comprehensive and reader-friendly research reviews are great. There are institutional barriers in the traditional publications, including liability, ethical issues, and difficulty in reaching consensus on evidence or the rules for evaluating that evidence. For Kinesiology practice to advance, we must overcome these barriers and develop and communicate systematic research reviews at all three levels.

One success story in bridging the gap is the National Strength and Conditioning Association's (NSCA) approach to publications. The NSCA sponsors several levels of publications from the applied science of the JSCR, their professional journal (*Strength and Conditioning Journal*), and the web-based magazine for the public called the *NSCA's Performance Training Journal*. The NSCA three-tiered approach encourages meaningful research reviews, strong, research-based professional publications, as well as dissemination of authoritative information to the public for educational and promotional purposes.

The dramatic expansion of the body of knowledge in Kinesiology and related fields requires that more narrative and quantitative (meta-analysis) reviews of the literature be published in the premier journals. Some progress has been made in reporting review papers, consensus conferences, position statements, and books (ACSM, 2000; Brown, 2004; Corbin & LeMasurier, 2002; Twisk, 2001). Biddle (1997) recommended that these publications summarize both, positions on "what we know" and on "what we need to know." If there are not enough data to make strong recommendations or position statements, white papers providing general guidelines can be developed. More of all kinds of reviews integrating growing and changing body of knowledge are needed.

Research reviews should also be published in Kinesiology professional journals. Since Kinesiology professionals have limited time and resources for surveying the research literature, so professional journal articles must be based on critical reviews of the body of knowledge and review papers for professionals should be regularly published. The author instructions for the *Strength and Conditioning Journal (SCJ)* makes it clear that the goal is to publish articles that "report both the practical applications of research findings and the knowledge gained by experienced professionals. . . integrating these two sources of knowledge" (*SCJ*, 2004:75). The journal has recently initiated a new column that summarizes the scientific basis for exercise prescription (Kraemer, 2004). The NSCA is clearly striving to systematically integrating the research literature into professional journal articles and review papers.

Professional journals in Kinesiology need to emulate the approach of *SCJ* and provide strong, systematic reviews of the research so that growth toward more evidence-based practice can be made in the Kinesiology professions (Graham, 2003; Steves & Hootman, 2004). More review papers focused on practical human movement teaching and exercise training issues for professional

audiences are clearly needed to help shrink the theory to practice gap.

Another important task is the transmission of research summaries for the public. These public service materials should be designed to focus on critical health or injury-related issues relating to physical activity. The release of white papers that can be posted on the web are important in two ways, providing authoritative basic information and promoting Kinesiology and Kinesiology professionals as the primary source for these services. It is vitally important that the public come to regard AAHPERD, AAKPE, ACSM, and NAKPEHE as the authoritative voices for exercise science information, not local personal trainers, celebrities, athletes, or any of the myriad of fitness web sites.

The American College of Sports Medicine has been a leader in developing position statements and white papers on exercise topics. Many of these papers have been written by committees with representatives of several professional and medical societies. ACSM has also recently taken the step of working with commercial sponsors (General Mills Wheaties®) to bring exercise information to the public. Kinesiology organizations need not only to be leaders in providing public education, but also in providing authoritative information via the Internet.

The point of using of mass media or the Internet is not to make money or shift our physical activity services to the computer. Trying to make money from publications of position statements or white papers does not fulfill our mission to serve the public, nor does it promote our field to the public in the electronic age. Web or commercially funded publications educating the public should point interested people to professional and scholarly reviews, as well as local professionals who can provide more information and individualized advice. The evidence suggests that the use of mass media only modestly affects physical activity behaviors (Marshall, Owen, & Bauman, 2004), but it does educate the public about these issues and the Kinesiology professionals that can help them. Some have argued that the field needs to shift to evidence- based policy initiatives to address the health issues related to low levels of physical activity (Smith & Bird, 2004).

Summary

A theory-to-practice gap has grown in Kinesiology because of a lack of institutional support for applied and interdisciplinary research, as well as poor delivery of serious reviews of an extensive body of knowledge. The theory-to- practice gap can be narrowed and gains in the quality and prestige of Kinesiology professions may be achieved by three reforms. The reforms include increasing the acceptance of applied research, increasing outlets for interdisciplinary research, increasing serious reviews of the literature in multiple outlets to Kinesiology professionals and the public. If academics and Kinesiology professionals hold themselves to collecting and applying higher standards of evidence, service to clients and the support for our programs will be enhanced.

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Figure 1. Hierarchy of evidence for informing professional practice in Kinesiology.