The methods to educate students with disabilities in physical education contexts vary greatly due to their unique characteristics and special needs, requiring different teaching methods on an individual basis. In order to improve educational outcomes for students with disabilities in physical education settings, teachers should employ evidence-based practice (EBP). However, EBP has not been well implemented in physical education. Although the first step of implementing EBP is identifying teachers’ readiness and current stages for change, effective ways to measure teachers’ intentions for changing their teaching behaviors have not been developed yet. The main purpose of this study was to develop a scale for evidence-based physical education and to evaluate psychometric properties of the new scale. A secondary purpose was to evaluate the effectiveness of different survey methods to examine the intention for changing teaching behavior.

A measurement system was developed on the basis of the Transtheoretical Model (TTM) and psychometric properties were examined. Results from the item
analyses showed that only two out of 58 items had poor discrimination functions and those two items were deleted. All 58 items revealed good or very good internal consistencies ranging from .87 to .90. Confirmatory factor analyses showed appropriate factor loading estimates and squared multiple correlations. Goodness of fit indices provided partial supports on three structural equation models. However there were no significant relationships between stages of change and the three components of the TTM.

Response rate, response completeness, response time, and administration costs between paper- and internet-based surveys were compared to identify an effective survey method in a physical education setting. The internet-based survey mode showed a higher response rate than the mail-based mode. Also, it revealed that the internet-based survey was more cost and time efficient than the traditional paper and pencil-based survey. In terms of response completeness, however, the internet-based mode had more missing values than the mail-based mode.

In conclusion, a newly developed measurement system showed an adequate level of validity evidence with good internal consistencies and it was revealed that the internet-based survey mode was a more effective survey method than the mail-based survey to examine readiness of implementing evidence-based physical education. Future studies should examine how to change teachers’ intentions and/or behaviors with evidence-based physical education in their classes. Also, the future studies should examine the strategies to prevent a missing value of the internet-based survey.
Evaluation of a Measurement System for Evidence-based Physical Education

by

Jooyeon Jin

A THESIS
Submitted to
Oregon State University

in partial fulfillment of
the requirements for the
degree of
Master of Science

Presented December 5, 2008
Commencement June 2009
Master of Science thesis of Jooyeon Jin presented on December 5, 2008.

APPROVED:

重大教授，代表运动研究在残疾

Chair of the Department of Nutrition and Exercise Sciences

Dean of the Graduate School

I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

Jooyeon Jin, Author
ACKNOWLEDGEMENTS

I would like to greatly appreciate Dr. Joonkoo Yun, my major advisor and great mentor, for his valuable time, help, guidance, encouragement, dedication, and patience throughout this project. I would also like to thank Dr. Jeff McCubbin for his support and encouragement during this study. To Dr. Barbara Cusimano, my minor advisor, thank you for your valuable comments regarding target population and guidance, especially for a pilot study in AAHPERD, Texas. To Brad Cardinal, thank you for your commitment and precious help, especially for the clarification on the TTM and sharing a web-survey account. Dr. Brian Flay, thank you for your helpful suggestions and comments in preparing this thesis.

In addition, to Dr. Miyoung Lee, thank you for your sincere suggestions for improvement. Special thanks to my colleagues in the MSD program for their time and efforts in preparing data collection. Huge thanks to Korean friends for their help in survey preparation and administration. Thanks to Simon Tatom and Tawnya Redding for their efforts and comments for English editing.

Finally, I would like to appreciate my family (Father, Mother, and Sister) and my fiancé (Heejung) for their dedication to support me throughout my work in the U.S.
CONTRIBUTION OF AUTHORS

Dr. Joonkoo Yun was involved with the study design, data collection, data management, and data analyses.
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Physical education is considered a direct service by the Individuals with Disabilities Education Act (IDEA), which requires that specialized physical education services should be provided to any student with disabilities who requires them (Block, 2007). However, the methods to educate students with disabilities vary greatly. Every student has unique characteristics and may require different and specific teaching strategies to meet his/her special needs. According to Block (1994), students with disabilities should receive an individually determined, appropriate program with supplementary services and supports to meet their unique needs.

Since the advent of the term “Evidence-Based Practice” in the medical profession in the early 1990s, the interest in EBP has extended into many other academic disciplines, such as nursing, sport medicine, and education. Educational professionals also are accepting the importance of teaching based on scientific evidence. Davies (1999) defined Evidence-Based Education (EBE) as the process to search and critically appraise research and evidence in order to determine its relevance to schools, students, and educational needs. Two main pieces of federal legislation, the Individuals with Disability Education Act (IDEA) and the No Child Left Behind Act (NCLB), are currently calling for education professionals to implement academic and behavioral interventions based on scientific research (U.S. Congress, 1997; U.S.
According to Slavin (2002), the phrase “scientifically based research” is mentioned 110 times in NCLB to emphasize the significance of EBE.

Physical educators who teach students with disabilities in their classes will need specific evidence to satisfy each student’s goal and need in their classes. In order to successfully implement an effective Individualized Education Program (IEP) for each student, EBE must play a pivotal role in increasing teachers’ confidence in decision making, minimizing the waste of time and money, and effectively solving a variety of problems which may arise in their classes. According to the National Council on Disability (NCD), teachers need to continuously develop new instructional skills in order to not only help students with disabilities learn to higher standards, but also change their beliefs and values (2004). As EBE would promote the best research and practice, it would improve the quality of physical education. A specific description regarding EBE for students with disabilities (e.g. benefits, level of evidence, and possible strategies) is in the first review paper (see Appendix A).

Despite the potential benefits, EBE has not been well implemented. Slavin (2003) noted that research has played a relatively minor role in education; even when there are evidence-based practices, teachers do not always use them (NCD, 2004). Some of the suggested barriers include a mismatch between teaching style and external evidence, a lack of fit between the evidence and other methods mandated by the school districts, and the teacher’s lack of in-depth understanding of teaching based on evidence (NCD). A number of educators may not accept EBE as a professional buzzword. Some may feel that they have not been trained to implement EBE and some
may have experienced complications in utilizing EBE due to the difficulty of reflection in educational systems.

In order to encourage implementing EBE, it is important to identify the teachers’ readiness and current stage for change, prior to simply emphasizing the importance of EBE. If action-oriented guidance were offered to all teachers who are willing to implement EBE, those who are not yet emotionally ready to change would be mis-served (Prochaska et al., 2005). According to Prochaska et al. (2005), the Transtheoretical Model (TTM) not only offers a systematic and empirically based approach to conceptualizing emotional readiness, but also provides sensitive assessments of this readiness. The purpose of the TTM is to explain how people change their behavior (Prochaska & DiClemente, 1983). The TTM suggested that people do not change all at once, but instead move through a series of stages representing their level of readiness to change (Ciccomascolo & Riebe, 2006). Readiness for change can be understood as people’s current thoughts, feelings and internal conditions as influenced by external factors (Miller & Rollnick, 1991).

The TTM systematically integrates the following four constructs central to change: stage of change, self-efficacy, decisional balance, and processes of change (Prochaska et al., 2005). Stage of change refers to a person’s readiness to change and includes pre-contemplation, contemplation, preparation, action, and maintenance (Spencer, Adams, Malone, Roy, & Yost, 2006). Self-efficacy is the degree of confidence a person has to change (Marcus, Selby, Niaura, & Rossi, 1992) and can influence motivation and persistence (Bandura, 1977). To increase self-efficacy, an individual would be encouraged to set realistic goals to move through the stages one at
a time (Prochaska et al., 2005). Decisional balance refers to the process of weighing the positive against the negative (Marcus, Eaton, Rossi, & Harlow, 1994). As the pros increase and the cons decrease, a person will move forward from contemplation into preparation and action (Spencer et al., 2006). The processes of change include five cognitive processes (consciousness raising, dramatic relief, environmental reevaluation, self-reevaluation, and social liberation) and five behavioral processes (counter-conditioning, helping relationships, contingent management, self-liberation, and stimulus control) that a person can use to move to the next stage (Marcus, Rossi, Selby, Niaura, & Abrams, 1992).

Most references to the TTM are in health-related areas (Xiao, O’Neill, Prochaska, Kerbel, Brennan, & Bristow, 2004) and have mainly focused on changing health-related behaviors, such as smoking cessation, sexual risk, obesity, dietary change, exercise promotion, exercise adherence, and regular exercise (e.g. Smith, & DiClemente, 2000; Baranowski, Cullen, Nicklas, Thompson, & Baranowski, 2003; Kristal, Glanz, Curry, & Patterson, 1999; Wright, Patterson, & Cardinal, 2000; Kasila, Poskiparta, Karhila, & Kettunen, 2003; Fallon, Hausenblas, & Nigg, 2005; Guillot, Kilpatrick, Hebert & Hollander, 2004; O’Connor, 1994). However, a lack of references regarding the TTM in education exists and the use of the TTM is limited. As a first step for implementing the TTM, it is necessary to develop an instrument to accurately identify teachers’ readiness for change.

A survey method is frequently used to assess and describe characteristics of a large group of people. It is a cost and time effective research tool and makes data analyses easier. Although using a paper and pencil questionnaire was a common
method to conduct a survey, the possibility of conducting a survey via internet has been advocated by scholars (Comley, 2002; Fricker & Schonlau, 2002; Jones, & Pitt, 1999) because of the widespread use of personal computers and advancement in internet technology. The distinctive advantages of using an internet based survey may include substantial cost effectiveness, faster response speed, and better data quality (less missing data). However, early research has pointed out a concern related to internet-based research. For example, Raziano, Jayadevappa, Valenzula, Weiner, and Lavizzo-Mourey (2001) reported that a postal mail survey had a higher response rate than a internet-based survey. Kwak and Radler (2002) also found that a mail survey generated a higher response rate than a web survey. However, internet technologies have been considerably developed and the use of the internet has been unbelievably widespread. According to Internet World Stats (2008), internet usage in North America has increased by 129.6%, and world internet usage has increased by 305.5% from 2000 to 2008. Based on these data, it is reasonable to expect that response rates of an internet-based survey from early 2000 will be sustainably different from 2008. Thus, the effectiveness between paper- and internet-based surveys needs to be reinvestigated.

The primary purpose of this study was the development and initial validation of a scale based on the TTM constructs for changing intention and teaching behavior to implement EBE for students with disabilities. It was essentially focused on how the scale develops along with the concept of EBE and theory for change. The secondary purpose of this study was to indentify an effective survey method to assess physical educators’ intentions to implement EBE in physical education. Four main factors
From paper- and internet-based surveys were compared to not only find an appropriate survey mode in physical education populations, but also develop a measurement system of assessing teachers’ readiness for change.

**Research Questions for Development of a Scale**

The following specific research questions were examined:

1. Did the developed scales about self-efficacy, decisional balance, and process of change have adequate item discrimination function and internal consistency?

2. Were the internal structures of the scales about self-efficacy, decisional balance, and processes of change congruent with the theoretical frame work?

3. Were there relationships between the stage of change and self-efficacy, decisional balance, and processes of change?

**Research Questions for Survey Method**

The following specific research questions were investigated:

1. Were there differences in response rates between mail- and internet-based surveys?

2. Were there differences in response completeness between mail- and internet-based surveys?

3. Were there differences in response speed between mail- and internet-based surveys?

4. Were there differences in administration cost between mail- and internet-based surveys?
Assumptions

1. Self-efficacy is a unidimensional construct.
2. Decisional balance is a multidimensional construct and consists of gain and loss.
3. Processes of change is a multidimensional construct and consists of cognitive and behavioral processes.
4. Survey format differences in two survey modes do not affect participants’ responses.
5. All participants honestly answered the questionnaires.

Limitations

1. Low response rate from people in precontemplation and contemplation stages to participated in the survey.

Delimitations

1. One hundred forty eight participants teaching physical education.
3. The quality of two survey modes is determined by four factors (response completeness, response rate, response speed, and cost).
Definitions

1. Evidence-based education: The best practice of integrating individual teaching strategies with the best available evidence from internet, articles, experts, professional conferences, and/or in-service training.

2. Transtheoretical model: A conceptual framework predicting behavioral and emotional change, and guiding appropriate intervention to progress across the stages of change with four constructs, including stage of change, self-efficacy, decisional balance, and processes of change.

3. Stage of change: An algorithm to classify people into a state of change.

4. Decisional balance: A process of weighing the gains (pros) against the losses (cons).

5. Self efficacy: A process to assess degree of confidence to change behavior in a variety of difficult situations and conditions.

6. Processes of change: A process to assess the frequency of applying cognitive and behavioral strategies that people use to progress at different stages of change.

This documentation was divided into two manuscripts. Also, the literature review was organized as two professional papers to advocate the implementation of EBP in adapted physical education and introduce the TTM to help change teaching behavior toward students with disabilities.
CHAPTER 2

Development of a Scale for Evidence-based Adapted Physical Education Based on Transtheoretical Model

Jooyeon Jin
Abstract

The purpose of this study was to develop and provide validity evidence of a measurement system based on the Transtheoretical Model (TTM) for change of teaching behavior with the intention to promote the use of evidence-based education for students with disabilities. A total of 148 educators teaching physical education participated in the surveys. Participants were recruited in schools at both the elementary and secondary levels in Northwest regions. Item analysis was conducted to evaluate appropriate discriminate functions for three components (self-efficacy (SE), decisional balance (DB), and processes of change (POC)). Internal structures of the three components of the TTM were examined by three confirmatory factor analyses with Maximum Likelihood estimation. The responses from stage of change were compared to the three constructs. Separate one way analyses of variance and multiple analyses of variance on each construct by stage were conducted to assess differences among the stages of change. Item analysis reported that only two items on the negative decisional balance among three TTM components had poor discrimination function. The two items were deleted, but item reduction was not necessary for the other components. Internal consistencies of SE, DB, and POS were found to be good or very good. Three structural equation models showed reasonable squared multiple correlation and factor loading estimates. Three models were partially supported by goodness of fit indices. Cross-validation with a large sample size will be desirable to refine this measurement system in the future studies.
Introduction

Physical education is considered a direct service in the Individuals with Disabilities Education Act (IDEA), which requires that specialized physical education services be provided to any student with disabilities who requires them (Block, 2007). However, the methods to educate students with disabilities vary greatly. Every student has unique characteristics and may require different and specific teaching strategies to meet his/her special needs. According to Block (1994), students with disabilities should receive an individually determined, appropriate program with supplementary services and support to meet their unique needs.

Since the advent of the term “Evidence-Based Practice” (EBP) in the medical profession in the early 1990s, the interest in EBP has extended into many other academic disciplines, such as nursing, sport medicine, and education. Educational professionals including policy makers, university faculty, and researchers are accepting the importance of teaching based on scientific evidence. Davies (1999) defined evidence-based education (EBE) as the process of searching and critically appraising research and evidence in order to determine its relevance in schools, students, and educational needs. In other words, EBE is defined as the process of integrating individual teaching strategies and expertise with the best available evidence. Two main pieces of federal legislation, in particular, IDEA and the No Child Left Behind Act (NCLB), are currently calling for education professionals to implement academic and behavioral interventions based on quality scientific evidence (U.S. Congress, 1997; U.S. Congress, 2001). According to Slavin (2002), the phrase
“scientifically based research” is mentioned 110 times in NCLB to emphasize the significance of evidence.

Adapted physical education (APE) teachers and general physical education (GPE) teachers who have students with disabilities may need specific evidence to satisfy each student’s goals and needs in their classes. If the teachers can implement the evidence for teaching with the Individualized Education Program (IEP) of each student, EBE will play a pivotal role in gaining confidence in decision making, minimizing the waste of time and money, and effectively solving a variety of problems related to teaching physical education. According to the National Council on Disability (NCD), teachers need to learn new instructional skills in order to not only help students with disabilities learn to higher standards, but also change their beliefs and values (2004). EBE would promote the best research and practice, and would improve the quality of physical education.

Despite the potential benefits, EBE has not been well implemented. Slavin (2003) noted that research has played a relatively minor role in education; even when there are evidence-based practices, teachers do not always use them for various reasons (NCD, 2004). Some of the suggested barriers include a mismatch between teaching style and external evidence, a lack of fit between the evidence and other methods mandated by school districts, and the teacher’s lack of in-depth understanding of teaching based on evidence (NCD, 2004). EBE may still be an unfamiliar concept to a number of educators in practice. Some may have skepticism because they believe that EBP does not have utility in educational settings due to the
difficulty of reflecting the complexity of activities and outcomes in educational systems.

In order to encourage implementing EBE, it is important to identify the teachers’ readiness and current stage for change, prior to simply emphasizing the importance of EBE. If action-oriented guidance were offered to all teachers who want to change, those who are not yet emotionally ready to change would be mis-served (Prochaska et al., 2005). According to Prochaska et al. (2005), the Transtheoretical Model (TTM) not only offers a systematic and empirically based approach to conceptualizing emotional readiness, but also provides sensitive assessments of this readiness. The purpose of the TTM is to explain how people change their behavior (Prochaska & DiClemente, 1983). According to the TTM, people do not change all at once, but instead move through a series of stages representing their level of readiness to change (Ciccomascolo & Riebe, 2006). Readiness for change can be understood as a person’s current thoughts, feelings and internal conditions as influenced by external factors (Miller & Rollnick, 1991). The TTM systematically integrates four constructs central to change: stage of change, self-efficacy, decisional balance, and processes of change (Prochaska et al., 2005).

The effectiveness of the TTM has been well documented in health related areas (Xiao, O’Neill, Prochaska, Kerbel, Brennan, & Bristow, 2004). However, the TTM has not been well employed in education settings and the use of TTM is limited. One possible reason is that TTM instruments for the educational change have rarely been developed. As a first step for implementing TTM, it is important to develop an instrument to accurately identify the teachers’ readiness for change. Importantly,
psychometric properties of the instruments should be evaluated to gather meaningful, appropriate, and useful data from teachers before actually generalizing the results of the studies. The purpose of this study was to develop a scale and provide validity evidence of the scale based on the TTM constructs for changing teaching intention and behavior to promote the use of EBE for students with disabilities. This study focuses on how the scale based upon core criteria for EBE is developed on a theory for change.

Methods

Participants

A total of 148 educators teaching physical education (42.8% males, and 57.2% females) participated in this study. They were recruited in schools at both the elementary and secondary levels in Northwest regions (States of Idaho, Montana, Oregon, Washington, and Wyoming). Table 2.1 represents percentages of participants based upon each region.

<table>
<thead>
<tr>
<th>Region</th>
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<tr>
<td>Idaho</td>
<td>12.3%</td>
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<tr>
<td>Montana</td>
<td>8.7%</td>
</tr>
<tr>
<td>Oregon</td>
<td>34.1%</td>
</tr>
<tr>
<td>Washington</td>
<td>41.3%</td>
</tr>
<tr>
<td>Wyoming</td>
<td>3.6%</td>
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The participants were 23 to 68 years old (M = 41.39, SD = 11.26) and had taught physical education for less than 1 year to 35 years (M = 12.68, and SD = 9.91).

Among 148 teachers, 36.1% had Bachelor’s degree, 61.8% finished a Master’s degree, 0.7% earned a Doctoral degree, and 1.4% got additional types of degrees (e.g. plus 45 credits, APE credential, and Administration credential). The number of teachers who have more than one teaching certifications were 67.4%. Approximately one third of
teachers (20.1% out of 67.4%) reported that they have multiple responsibilities, such as teaching health education in addition to physical education.

Development of the Instrument

The questionnaire was comprised of five sections: background information, stages of change to implement EBE, self-efficacy, decisional balance, and processes of change. The first section was intended for gathering background information and consisted of two parts related to teachers’ demographic information (gender, age, teaching experience, teaching certification, and grades taught) and school environments (location of school, teaching system, the use of Individualized Education Program (IEP), and physical education time). The other four sections were based on the TTM and incorporated with the concept of EBE, which is defined as the best practice of integrating individual teaching strategies with the best available evidence from the internet, articles, experts, professional conferences, and/or in-service training. The questionnaire was designed not only to assess teachers’ current stages and emotional readiness, but also to guide appropriate strategies to implement EBE for students with disabilities based on existing algorithms, measures, and scales, using TTM constructs on health related behavior (Noia, Schinke, Prochaska, & Contento, 2006), exercise behavior (Laffrey & Lee, 2005), and other behavior changes (Xiao et al., 2004), as well as emotional changes (Prochaska et al., 2005).

Based on the recommendation of Yun and Ulrich (2002), content-related evidence was evaluated with four steps: (a) defining the domain of interest, (b) selecting a panel of judges, (c) having the panel of judges evaluate the instrument based on specific criteria, and (d) summarizing the information and selecting
appropriate items. As the first step, operational definitions of EBE and the four components of the TTM were provided in the questionnaire to help content experts make judgments based upon the definitions. Second, the prototype questionnaire was evaluated by eight experts: five university professors who have Ph.D.s in the field of exercise science and public health, and three physical education teachers who are currently teaching physical education in practice. One of the professors was involved in adapted physical activity (APA), and publishes papers regarding TTM to improve the level of physical activities for individuals with disabilities. The second professor, involved in exercise psychology, was a TTM specialist and published numerous papers regarding TTM in a variety of topics, including APA. The third professor has conducted prolific health-related research, and the remaining professors were involved in physical education teacher education programs. For the third step, these experts were asked to review wording and how well the four components of TTM fit in the field of physical education. Appropriateness, usefulness, and meaningfulness of the algorithm on section two, the structure of each section, and overall questionnaire design were also considered as a content validation by the experts. As the last step, structures, directions, and statements on each section were corrected or eliminated based on the feedback of the experts. In section one, the order of questions was changed, and specific words, such as terminologies in APA, were added to a couple of questions to help participants clearly and easily understand and answer the questions. The remaining changes are discussed in the description of each section below.

The web-based questionnaire was developed on the web using the same questions as the paper questionnaire. To minimize the errors from delivery of the
contents of the paper questionnaire, the same organization and directions were employed, with a modified structure.

**Stage of Change (SOC).** Stage of change refers to a person’s readiness to change and includes precontemplation, contemplation, preparation, action, and maintenance (Spencer, Adams, Malone, Roy, & Yost, 2006). In order to identify the appropriate stage of change, an algorithm was developed based on the recommendation of Reed, Velicer, Prochaska, Rossi, and Marcus (1997). This algorithm was partly modified from the previous TTM studies in exercise, adoption, dietary intervention, and using a food thermometer (Kristal, Glanz, Curry, & Patterson, 1999; Prochaska et al., 2005; Takeuchi, Edlefsen, McMurdy, & Hillers, 2006). After feedback from the content experts, the directions and the algorithm structure were appropriately changed. As a simple pilot test on the stage algorithm, in addition, fourteen graduate teaching assistants, who were currently teaching students at the college level, were asked to follow the directions and complete section 2. After the pilot testing, the algorithm format was modified to improve understanding of the format and directions.

Questions were formatted using two systems of six-choice (with the option of selecting multiple choices) in question one and yes/no in questions two through five to assess current stages of physical education teachers in regards to implementing EBE. This algorithm focused on teaching behavior change (using EBE) and categorized the responses of participants into five stages: precontemplation, contemplation, preparation, action, and maintenance. If participants selected ‘yes’ on question two and again selected ‘yes’ on question four, they were coded to the maintenance stage.
when analyzing data. Those who answered ‘Yes’ on question two and ‘no’ on question four were coded to the action stage, and ‘no’ on question two and ‘yes’ on question five were coded to the preparation stage. ‘No’ on both question two and five were coded to the contemplation stage, ‘yes’ on question three and ‘yes’ again on question five were coded to preparation stage. ‘Yes’ on question three and ‘no’ on question five were coded to the contemplation stage, and ‘no’ on question three was coded to the precontemplation stage.

*Self-Efficacy (SE).* The measures and scales for SE were designed to assess teachers’ degree of confidence in implementing EBE in a variety of difficult situations and conditions, which consist of social, personal, and environmental barriers, represented from literature regarding EBE. The items were created in accordance with the concept of EBE, and partly modified from the measures of Rossi, Bensisovich, Norman, and Nigg (1998). Twenty three difficult circumstances (e.g. “Administrators in my school don’t provide enough support”) were created and teachers asked to indicate how confident they were in their ability to use EBE in those difficult circumstances. After measurement of content validation from experts, 20 out of 22 statements in the original list were reduced and refined to 14 statements on the questionnaire, and directions were restated. One scale among five scales was changed from ‘very confident’ to ‘completely confident’, so section 4 employed a five-point Likert-type scale ranging from 1 (not at all confident) to 5 (completely confident).

*Decisional Balance (DB).* The DB items were designed to assess the process of weighing the gains against the losses to implement EBE. Advantages and disadvantages of implementing EBE from relevant literature were reflected to
structure these items. The measures and scales for DB were based on items by Plotnikoff, Blanchard, Hotz, and Rhodes (2001); Laffrey and Lee (2005); and Noia et al. (2006). The 18 items consisted of nine pros (e.g. “Evidence-based Education would help me develop problem solving skills”) and nine cons (e.g. “I have not enough time to search for evidence because of my other daily responsibilities”). After measurement of content validation from experts, 16 out of 18 original items were reduced to 14 items on the questionnaire without wording change, and the font size was enlarged. A 5-point scale ranging from 1 (not at all) to 5 (extremely) was also changed to a Likert-type scale ranging from ‘completely disagree’ to ‘completely agree’, in order to assess positive and negative aspects of implementing EBE.

Processes of Change (POC). The processes of change included five cognitive processes and five behavioral processes that a person can use to move to the next stage (Marcus, Rossi, Selby, Niaura, & Abrams, 1992). The POC items were designed to assess the frequency of applying cognitive and behavioral strategies that teachers use to progress at different stages of change. The 48 items for POC, which are divided into two parts, cognitive (consciousness raising, dramatic relief, environmental reevaluation, self-reevaluation, and social liberation) and behavioral processes (counter-conditioning, helping relationships, contingent management, self-liberation, and stimulus control), were created based on EBE literature. Twenty five cognitive processes (e.g. “I think about information from articles and books on how to answer questions in my teaching”) and 23 behavioral processes (e.g. “Instead of only relying on former teaching experience, I search for external information from internet, articles, in-service training or experts to improve physical education for students with
disabilities”) were modified from item measures of Prochaska, Norcross, & Diclemente (1994); Nigg, Norman, Rossi, & Benisovich (1999); and Xiao et al. (2004). All items used a five-point Likert-type scale ranging from 1 (never) to 5 (very often) to determine the frequency of application. Thirty out of the 48 items were extracted to the actual questionnaire. After feedback from the content experts, four items were eliminated and a majority of statements were corrected and reworded to better represent the concepts of the two constructs in processes of change of TTM. Directions were slightly changed and the font size was enlarged.

**Procedures**

For this study, the following sampling process was followed. First, a list of all schools (N = 5547) of both elementary and secondary levels in Northwest regions was obtained from each State’s department of education websites. A total of 1400 schools out of the 5547 schools were selected by a stratified random sampling method. A website search was conducted to identify names and email addresses of educators teaching physical education. A random number generator was used to randomly select an educator if a school had more than two educators teaching physical education. If a physical education teacher did not exist on the teacher list of the school website, a classroom teacher was randomly selected (mostly in case of elementary schools). Two exclusion criteria were employed: (a) school names including alternative, charter, academy, and center and (b) small schools which have less than 5 teachers and 20 students. Schools which met one of these criteria, were excluded from the sample list and new schools were reselected from the entire list (N = 5547) by stratified random sampling. For schools that didn’t have website or teachers’ information on the
website, a telephone search was conducted. A school secretary was asked to randomly select a teacher if his/her school had more than two educators teaching physical education. A total of 980 educators who were teaching physical education were identified and randomly divided into a web-based sample (n = 580) and a mail-based sample (n = 400). As response rates of web-based surveys have been reported to be lower than mail-based surveys, more samples were assigned into the web-based survey.

Invitation letters were sent out to a web-based sample group to provide a brief introduction and the web address for the questionnaire. The selected teachers were asked to participate in the web-based survey. A written statement, including the key elements of consent information, was provided on the first page of the web-based questionnaire. After five days, an email invitation was sent out to each participant in order to stress the importance of their participation and encourage them to access the web-based survey. An email follow-up was sent to those who had not responded after another six days, and a second email reminder was sent out after six more days.

In congruence with the web-based survey, the initial questionnaire packets, including the questionnaire, a cover letter (invitation letter), and return envelope, were sent to a mail-based sample group. Each teacher was asked to complete and return the questionnaire. The cover letter contained a written statement regarding consent information of this study. Approximately two weeks after the initial mailing, follow-up packets, including the same materials as the initial mailing, were sent to teachers who had not completed and returned the surveys. Responses from the two survey modes were collected for approximately four weeks in total.
One hundred forty eight teachers responded to the survey. Response rates were 20% (web-based survey) and 11% (mail survey). A total of 65 emails and 12 questionnaire packets were undelivered and these undeliverables were not included in calculation of the response rates. A participant from the web-based survey and a participant from the mail survey each received a $100 gift card by random drawing as an incentive.

Analysis

The data analysis was conducted in three parts: (a) conducting item analysis, (b) examining internal structure of the instrument, and (c) examining the relationship of change to other constructs. To minimize limitations derived from missing data in analysis procedures, survey responses from 148 participants were reduced to 115 against the following criterion: if a participant did not respond to more than 15% of entire sections, the participant’s data were deleted.

Item analysis was conducted to evaluate appropriate discriminated function for self-efficacy, decisional balance, and processes of change using the corrected point-biserial correlation and Cronbach’s alpha when a particular item is deleted. To interpret point-biserial correlation, .40 or more was considered to be very good, .30 – .39 as good, .20 –.29 as marginal, and .19 or less as poor discrimination. As an acceptable indicator for Cronbach’s alpha coefficients, a cut off score of .70 was used. Based on the results of the item discrimination and reliability evidence, item reduction was determined to eliminate ambiguous or misleading items.

Internal structures of self-efficacy, decisional balance, and processes of change were examined by three confirmatory factor analyses with Maximum Likelihood
estimation using AMOS 16.0. Three structural equation models were specified based on the theoretical foundation of TTM in order to ascertain the factor structure fit to the theoretical rationale. Items which had poor discrimination were excluded from the factor analyses. For the self-efficacy measurement, all items were entered on a single construct to examine a proposed factor structure that adequately fits the survey data. For decisional balance, items that satisfied the minimal criteria of discriminated function were entered on two constructs, pros and cons. A total of 7 pro items and 5 con items were entered. In the third model, processes of change items were entered on two constructs, cognitive and behavioral processes. Four common indices were calculated to evaluate the fit of the three models: (a) the root mean square error of approximation (RMSEA), (b) the chi-square/degrees of freedom ratio ($\chi^2$/df), and (c) the comparative fit index (CFI). General guidelines of the fit indices were employed to evaluate each value. Cut off scores .95 (CFI) was used and the value of $\chi^2$/df was acceptable if it was 3 or less. RMSEA was considered as close fit with the value of .05 or less and unacceptable fit with the value of > 1.0 (Driver, 2007; Driver, 2008; Yun & Shapiro, 2004).

The responses from stage of change were compared to the other three constructs (self-efficacy, decisional balance, and processes of change). One way analyses of variance (ANOVA) on self-efficacy by stage, and separate multiple analyses of variance (MANOVA) on decisional balance and processes of change by stage were conducted to assess differences among the stages of change. People in early stages were hypothesized to show lower self-efficacy than people in later stages, and those in the maintenance stage should show the highest (Jones, Harris, Waller, &
Coggins, 2005). The cons of decisional balance should outweigh the pros in the earlier stage, and the pros should outweigh the cons in the action stage (Prochaska et al., 2005). In general terms, cognitive processes of change are most useful during the earlier stages, whereas behavioral processes of change are most useful during the action and maintenance stage (Prochaska & Norcross, 2001). Based on these references, the differences among stages of change with the three constructs (self-efficacy, decisional balance, and processes of change) were analyzed to examine how the three constructs contribute to stage differences.

Results

Respondents from elementary schools were 59.7% and 40.2% were from secondary schools (20.1% from middle and 20.1% from high schools). They reported that 59% of elementary school students were attending physical education for 30 to 60 minutes per week, and 41% of secondary school students were attending for 190 to 240 minutes per week. Figure 2.1 shows the amount of minutes in which students have physical education per week in elementary and secondary schools. Other responses included 80 minutes per day for ½ year, 450 minutes per semester, and more than 250 minutes per week.
Figure 2.1 Percentage of physical education time per week by grade level

Approximately 98% of physical educators were teaching students with disabilities, but only 81% of students had an individualized education program (IEP) in physical education. Table 2.2 summarizes responses regarding inclusion in physical education and IEP.

Table 2.2 School environments for students with disabilities

<table>
<thead>
<tr>
<th></th>
<th>Segregated PE class</th>
<th>Inclusion PE class</th>
<th>IEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>28.2%</td>
<td>95.1%</td>
<td>81.4%</td>
</tr>
<tr>
<td>No</td>
<td>71.8%</td>
<td>4.9%</td>
<td>13.6%</td>
</tr>
<tr>
<td>Don’t know</td>
<td>0%</td>
<td>0%</td>
<td>5.0%</td>
</tr>
</tbody>
</table>

Item Analysis

Self efficacy. Among 14 items in the SE section, 13 items were considered very good (more than .40). One item (item 4) had less than .40 but still indicated good item discrimination value (.34). As a result, no item reduction was necessary. Table 2.3 shows results of item-total correlation estimates in SE. Cronbach’s Alpha coefficient on 14 items was .90 representing excellent internal consistency.
Table 2.3 Item discrimination (Item-total correlation) in SE measure

<table>
<thead>
<tr>
<th>No.</th>
<th>Items in self-efficacy measure</th>
<th>Item-total correlation</th>
<th>Cronbach’s alpha if item deleted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Administrators in my school don’t provide enough support.</td>
<td>.49</td>
<td>.89</td>
</tr>
<tr>
<td>2</td>
<td>I feel I don’t have the time.</td>
<td>.54</td>
<td>.89</td>
</tr>
<tr>
<td>3</td>
<td>I feel pressures associated with insufficient teaching materials for students with disabilities.</td>
<td>.49</td>
<td>.89</td>
</tr>
<tr>
<td>4</td>
<td>I feel there is a lack of fit between evidence-based education and the state/district policy.</td>
<td>.34</td>
<td>.90</td>
</tr>
<tr>
<td>5</td>
<td>I feel using evidence-based education is a mismatch with my teaching style.</td>
<td>.61</td>
<td>.89</td>
</tr>
<tr>
<td>6</td>
<td>I feel that there is no assuring the validity of the evidence.</td>
<td>.57</td>
<td>.89</td>
</tr>
<tr>
<td>7</td>
<td>There is no incentive to use evidence-based education.</td>
<td>.68</td>
<td>.89</td>
</tr>
<tr>
<td>8</td>
<td>I experience complications in using evidence-based education.</td>
<td>.68</td>
<td>.89</td>
</tr>
<tr>
<td>9</td>
<td>I notice that there are no improvements.</td>
<td>.64</td>
<td>.89</td>
</tr>
<tr>
<td>10</td>
<td>Other teachers tell me that using evidence-based education is meaningless.</td>
<td>.64</td>
<td>.89</td>
</tr>
<tr>
<td>11</td>
<td>I don’t have access to internet searching.</td>
<td>.66</td>
<td>.89</td>
</tr>
<tr>
<td>12</td>
<td>My colleagues don’t want me to use evidence-based education.</td>
<td>.68</td>
<td>.89</td>
</tr>
<tr>
<td>13</td>
<td>External evidence seems to be complicated to use.</td>
<td>.67</td>
<td>.89</td>
</tr>
<tr>
<td>14</td>
<td>I am doing poorly in my job and feel worried.</td>
<td>.69</td>
<td>.89</td>
</tr>
</tbody>
</table>

Decisional balance. Items on DB were divided into two parts for item discrimination because DB consists of positive and negative constructs. Table 2.4 and 2.5 summarize the results of item-total correlation estimates for positive and negative respectively. Item reduction was not necessary as all positive items had very good item discrimination. However, there was a different look on the negative construct. In comparison with positive, only two items had very good discrimination functions. Item 2 and 6 had poor discrimination function, .19 and .15 respectively, and consequently the number of items in negative construct was reduced from 7 to 5 items. Cronbach’s alpha for positive was .90 indicating very good internal consistency,
whereas the negative one was .59 before two items were removed, but after reduction of two items Cronbach’s alpha slightly increased to .61.

**Table 2.4** Item discrimination (Item-total correlation) in positive DB measure

<table>
<thead>
<tr>
<th>No.</th>
<th>Items in positive decisional balance measure</th>
<th>Item-total correlation</th>
<th>Cronbach’s alpha if item deleted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Evidence-based education would help me develop teaching skills to satisfy individual needs.</td>
<td>.73</td>
<td>.89</td>
</tr>
<tr>
<td>3</td>
<td>Evidence-based education would help me develop problem solving skills.</td>
<td>.62</td>
<td>.90</td>
</tr>
<tr>
<td>5</td>
<td>Evidence-based education would help students with disabilities to effectively achieve educational goals in physical education.</td>
<td>.71</td>
<td>.89</td>
</tr>
<tr>
<td>7</td>
<td>Evidence-based education would improve the quality of physical education.</td>
<td>.81</td>
<td>.88</td>
</tr>
<tr>
<td>9</td>
<td>Evidence-based education would help me design meaningful tasks and achieve high success for students with disabilities in physical education.</td>
<td>.68</td>
<td>.89</td>
</tr>
<tr>
<td>11</td>
<td>I would feel more confident making decisions about my teaching by implementing evidence-based education.</td>
<td>.75</td>
<td>.88</td>
</tr>
<tr>
<td>13</td>
<td>Evidence-based education would help me minimize wasting time and money to develop appropriate physical education programs.</td>
<td>.69</td>
<td>.89</td>
</tr>
</tbody>
</table>

**Table 2.5** Item discrimination (Item-total correlation) in negative DB measure

<table>
<thead>
<tr>
<th>No.</th>
<th>Items in negative decisional balance measure</th>
<th>Item-total correlation</th>
<th>Cronbach’s alpha if item deleted</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Evidence-based education may not always work.</td>
<td>.19*</td>
<td>.59</td>
</tr>
<tr>
<td>4</td>
<td>It is too much trouble to search for evidence that I want to use.</td>
<td>.49</td>
<td>.49</td>
</tr>
<tr>
<td>6</td>
<td>I believe my real experiences are a much better way to satisfy educational goals of students with disabilities.</td>
<td>.15*</td>
<td>.60</td>
</tr>
<tr>
<td>8</td>
<td>I don’t have enough time to search for evidence because of my other daily responsibilities.</td>
<td>.36</td>
<td>.53</td>
</tr>
<tr>
<td>10</td>
<td>I was never trained to use evidence-based education in my teacher education training program.</td>
<td>.32</td>
<td>.55</td>
</tr>
<tr>
<td>12</td>
<td>The gap between evidence and practice definitely exist.</td>
<td>.23</td>
<td>.58</td>
</tr>
<tr>
<td>14</td>
<td>I am not sure why evidence-based education is a</td>
<td>.43</td>
<td>.50</td>
</tr>
</tbody>
</table>
better way of providing physical education for students with disabilities.

*Note:* Poor item discrimination

**Processes of change.** POC was comprised of 30 items representing 10 processes of change with cognitive and behavioral processes. Fifteen items (1-5, 11-15, and 21-15) were designed to be involved in cognitive construct and the other 15 items (6-10, 16-20, and 26-30) were designed to be involved in behavioral construct. Table 2.6 and 2.7 describe the results of item analyses for cognitive and behavioral processes of change in order. Other than item 2 and 23, all cognitive items had item discrimination functions ranges from .42 to .73, which are considered to be very good item discrimination function. The coefficients for item 2 and 23 were .36 and .30, which are still categorized as good discrimination functions. On behavioral items, only one item had a discrimination function below .40. This item could be revised, but it was in the acceptable range between .20 and .29. In the POC section, item reduction or change was not necessary. Cronbach’s alpha on cognitive construct was .87 which is considered good and the behavioral one was .90 which is excellent internal consistency.

### Table 2.6 Item discrimination (Item-total correlation) in cognitive POC measure

<table>
<thead>
<tr>
<th>No.</th>
<th>Items in cognitive processes of change measure</th>
<th>Item-total correlation</th>
<th>Cronbach’s alpha if item deleted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I look for information to solve problems related to my teaching.</td>
<td>.42</td>
<td>.87</td>
</tr>
<tr>
<td></td>
<td>I react emotionally about the consequences of my mistakes while I am teaching students with disabilities.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>In a professional conference I realize that I might be able to improve educational outcomes for students</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>with disabilities by using external evidence more</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>.36</td>
<td>.87</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>.52</td>
<td>.86</td>
</tr>
</tbody>
</table>
often.
4 I feel more confident when I teach based on external 
evidence.
5 I find that school is changing to evidence-based 
education in ways that make it easier to educate 
students with disabilities.
11 I think about information from articles and books on 
how to answer questions in my teaching. 
Remembering reports about negative consequences 
by teaching based on only personal experience 
upsets me.
13 Through an in-service training, I realize that if I 
don’t use external information, I may stay at the 
same level of teaching skills and be less effective to 
students with disabilities.
14 I believe that regular evidence-based education will 
make me a problem-solving teacher.
15 I read or hear about teachers who have successfully 
implemented physical education based on external 
information for students with disabilities.
21 I read articles about how to improve my teaching. 
22 I am afraid of the negative results when I do not 
implement best practices in my teaching for students 
with disabilities in physical education.
23 I think that the structure of gym environments 
would effect implementation of evidence-based 
education for students with disabilities in physical 
education.
24 I would feel better about myself when I implement 
best practice.
25 I notice that teachers, who obtained awards based on 
their teaching, use external evidence in their 
teaching.

Table 2.7 Item discrimination (Item-total correlation) in behavioral POC measure

<table>
<thead>
<tr>
<th>No.</th>
<th>Items in behavioral processes of change measure</th>
<th>Item-total correlation</th>
<th>Cronbach’s alpha if item deleted</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Instead of only relying on my former teaching experiences, I search for external information from the internet, articles, in-service training, or experts to improve physical education for students with disabilities.</td>
<td>.60</td>
<td>.89</td>
</tr>
<tr>
<td>7</td>
<td>I have a colleague who encourages me to implement best practice when I don’t feel up to it.</td>
<td>.44</td>
<td>.90</td>
</tr>
</tbody>
</table>
I find that I get the benefit of having more teaching skills when I regularly implement best practice. .65 .88
I make commitment to implement best practice. .71 .88
I keep attending conferences to remind me to implement best practice. .63 .88
I make myself use external information to teach students with disabilities in my physical education in my classes even when the external information is hard to apply. .55 .89
I have someone who encourages me to do best practice. .59 .89
I try to think of evidence-based education as a way to satisfy the special needs and individuals characteristics of students with disabilities in physical education classes. .67 .88
I believe, if I want to implement best practice, I can do it. .54 .89
I use a lesson card in my classes to remind me of best practice. .43 .89
Even when I feel tired, I will do best practice anyway. .62 .89
I surround myself with people who are trying to improve their teaching. .51 .89
I reward myself for taking small steps toward implementing best practice. .67 .88
I tell myself that I can keep implementing best practice if I try hard enough. .71 .88
I try not to associate with teachers that “roll out the ball.” .28* .90

Note: * Not good, but acceptable item discrimination

Internal Test Structure

Self efficacy. The SE structural model (Figure 2.2) was assessed by a construct linked with 14 factors. Range of the squared multiple correlations was from .22 to .57, and range of factor loadings was from .47 to .76. As goodness of fit indices, CFI (.72) RMSEA (.17), and $\chi^2$/df (4.21) suggested that this proposed model is unfit.
**Figure 2.2** Standardized estimates for SE structural model

*Decisional balance.* The DB structural model is graphically illustrated in Figure 2.3. Positive construct linked with 7 factors and negative construct linked with 5 factors were included, because two items that have poor item discrimination in negative construct were eliminated. RMSEA index (.07) was marginally fit and different fit indices were perfectly fit ($\chi^2$/df =1.62, and CFI=.93). The squared multiple correlations ranged from .43 to .72 on positive construct and from .01 to .74 on negative. The range of factor loadings was .65 to .85 and .11 to .86, respectively. The correlation between the pros and cons constructs was .53.
Processes of change. Figure 2.4 displays the POC structural model and each construct has 15 factors. The range of the squared multiple correlations was from .13 to .60, and factor loading was distributed from .36 to .77 in cognitive processes. The squared multiple correlations ranged from .10 to .60 and factor loadings ranged from .32 to .78 in behavioral processes. Indices of $\chi^2/df$ (2.22) indicated that this factor structure is fit, but RMSEA (.10) and CFI (.67) were not. The correlation between the cognitive and behavioral constructs was .85.
Figure 2.4 Standardized estimates for POC structural model

Relationship of Stage Change to Other Constructs

To examine the relationship of the stage of change to self-efficacy, one-way ANOVA was used, and MANOVAs were conducted to compare stage of change to decisional balance and processes of change. Based on responses from the SOC algorithm in section 2, participants were classified into one of the five stages. Due to extremely low numbers in early stages (precontemplation, contemplation, and
preparation), responses of 5 stages were reclassified into 3 stages: Before action (8.8%), Action (9.6%), and Maintenance (81.6%).

*Self efficacy.* Teachers in the Before Action (BA) stage have less confidence about evidence-based physical education than those in the Action (A) and Maintenance (M) stages (Figure 2.5). However, one-way ANOVA on self efficacy by stage revealed no significant differences with $F (2, 110) = .11, p > .05$. Standard deviations across the stage of change were .54 (BA), .71 (A), and .70 (M) respectively.

![Confidence by stage of change](image)

**Figure 2.5** Confidence by stage of change

*Decisional balance.* As expected, the pros in the A and M stages are higher than pros in the BA stage. In contrast, cons in the A and M stages are lower than cons in the BA stage. These patterns shown in Figure 2.6 indicate that teachers in the BA stage have less pros and more cons toward evidence-based physical education than those in the A and M stages. However, MANOVA on decisional balance by stage found that there are non-significant Wilks’ Lambda = .96 and $F (2, 111) = 1.01, p > .05$
between decisional balance and stage of change. Standard deviations were .49 (BA), .60 (A), and .59 (M) respectively.

![Figure 2.6 Decisional balance by stage of change](image)

**Figure 2.6** Decisional balance by stage of change

*Processes of change.* Figure 2.7 shows that there are stage differences for the processes of change. These patterns indicate that teachers in higher stages are applying more behavioral processes of change, and teachers in lower stages are applying more cognitive processes of change to implement evidence-based physical education. However, MANOVA did not support that processes of change are not significantly related to stage of change (Wilks’ Lambda = .94, F (2,111) = 1.69, p>.05). Standard deviations were .83 (BA), .60 (A), and .66 (M) respectively.
Discussion

Physical education is an integral part of educating a student with disability to develop his/her knowledge, attitude, and behavior in cognitive and affective domains, as well as psychomotor domain. Quality of physical education for a student with a disability is determined by how effectively a physical education teacher satisfies the student’s special characteristics and educational needs. However, the quality physical education for students with disabilities is not simply achieved since their educational needs vary widely. To overcome this challenge, physical education teachers should be familiar with EBE. A scale was developed based on the TTM as a first step to assess physical educators’ readiness and current stage for using EBE. Validity evidence for this scale was investigated through item analyses, confirmatory factor analyses, and analyses of variances (ANOVA and MANOVAs).

Item analyses were conducted to assess quality of items and reduce the number of items in each measure. Study results provided strong discrimination functions in
three TTM measures, except for two items on the negative decisional balance measure. Cronbach’s alpha coefficients of three measures were also considered to be good (cognitive POC) or very good (SE, DB, and behavioral POC). As a result, only two items were eliminated and additional item reduction was not necessary. These findings showed an individual item is measuring the same thing as the rest of items and items are highly correlated with each other.

To examine construct validity of the new measurement system, confirmatory factor analyses were conducted. Structural equation models of self-efficacy, decisional balance, and processes of change were made to confirm how the measures are consistent with the theoretical constructs of TTM. All factor loadings of SE measure could be considered to be meaningful because they all exceeded .30, but none of three fit indices supported that a SE construct fits to the proposed model. In the DB measure, all factor loadings exceeded .30 other than item 12 (.11) on negative DB. The squared multiple correlations of item 12 also showed extremely low estimate (.01). All three fit indices reported two constructs, pros and cons, are explaining the DB model. Reduction or correction of item 12 in DB measure should be considered in future studies. All factor loadings of POC items had more than .30, which is considered to be appropriate, and $\chi^2/$df out of three fit indices represented cognitive and behavioral constructs are fit to the POC model. Overall, estimates the factor loadings and the squared multiple correlations were reasonably high, whereas goodness of fit indices partially supported the proposed model.

The external validity of TTM constructs was provided by examining relationship of the stage of change to self-efficacy, decisional balance, and processes
of change. All graphical figures appeared to be different among each stage, which were congruent with expected pattern from previous TTM literature. However, probably due to large standard deviations of SE, DB, and POC, there were no significant differences in the stages of change.

In sum, quality of items was revealed to be quite good, but study findings from factor structural models and external validity examination did not support the conceptual base of the measurement system developed in this study. The critical limitations for these findings may be small sample size and sampling bias. The overall response rate was lower (M = 16%) than expected and also when compared to other surveys. One of the possible reasons was survey timing. Both surveys were sent to the teachers and asked to be completed between mid-May to mid-June. The timing was approaching the end of the year and summer vacation for the teachers, which means a lot of paperwork to finish (fatigue) and relaxed mind toward summer (low motivation). Future studies should be tried during the fall or winter and may inspire teachers to be highly enthusiastic and motivated to do new work.

In the stage of change section, responses were distributed to each stage, but the number of people in low level stages (precontemplation, contemplation, and preparation stages) was extremely small that may have resulted in a sampling bias. Consequently, this situation causes weak external validity evidence of stage of change, although the three other TTM constructs were fit to the stage. This problem led to a weak relationship between stage of change and the other three constructs.

There are three potential reasons for this sampling bias. One of the reasons would be the stage of change algorithm problem. TTM was mainly used in health
related areas and has only moved to physical activity related areas recently, and as a result a proper algorithm does not exist in education related fields. Also, there were a variety of algorithms depending on study themes and population even though they are in the same health related areas. TTM specialists who have great expertise regarding the TTM recommended that a 5-choice or a true/false response format is effective in assessing stage in their study (Reed et al., 1997). The algorithm in this study employed a six-choice (with the option of selecting multiple choices) and a true/false format based on their recommendation, and was newly created with partial modification from other stage models. However, it did not work well. The algorithm should be re-designed appropriately to classify teachers into five stages in the future studies.

The second potential reason would be that the concept of EBE is a new approach to teachers. EBE was defined with the best practice, which is common terminology in education communities and other sections used EBE and best practice interchangeably on their statements to overcome this issue. However, the definition might not be enough to fully understand the concept of EBE, and questions might not determine if a teacher uses EBE. In question one, for example, respondents who marked ‘Using own expertise’ and ‘Using own experience’ were regarded as people who were not implementing EBE. Respondents who marked “Asking experts’, ‘Searching internet’, ‘Reading articles’, and ‘In-service training’ were classified as people who were implementing EBE. This sorting system was not enough to classify practitioners using EBE based on just six criteria in that EBE could be recognized to a pretty broad concept in the educational profession. Future studies should design an effective sorting system to more easily divide EBE and none-EBE groups.
The last potential reason is the fact that individuals in the lower stages (preparation, contemplation, and preparation) tend to not respond to the TTM questionnaire. Teachers who are not committed to implementing EBE or not interested in best practice were probably less likely to complete the survey. This problem has been discussed in previous TTM studies as one of the continuous limitations of the TTM measure (Prochaska, Mauriello, Sherman, Harlow, Silver, & Trubatch, 2006). Future studies need to focus more on developing an appropriate algorithm system first because stage matched interventions can not be delivered without a suitable stage distribution mechanism (Reed et al., 1997).
References


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CHAPTER 3

Identifying an Effective Survey Method to Assess a Physical Educator’s Readiness for Changing Teaching Behavior

Jooyeon Jin
Abstract

The purpose of this study was to identify the effectiveness of two survey modes to assess a teacher’s readiness for change. The response rate, response completeness, response time, and administration costs between paper- and internet-based surveys in a physical education setting were compared to indentify the most effective survey mode. Participants were 131 educators teaching physical education in elementary and secondary schools across the Northwest of the United States. Two sample t-tests on log transformations were used to compare the group differences on response completeness and response speed. The internet-based survey mode showed a higher response rate than the mail-based mode. The internet-based group tended to leave significantly more unanswered items than the mail-based group (t = 7.63, p <.01). Overall response speed of internet-based survey was significantly faster than mail-based survey (t = 8.89, p<.01). The cost of the internet-based survey was four times cheaper than the mail-based survey. It was revealed that internet-based survey is an effective survey method for teachers in a physical education setting.
Introduction

Survey methods are important for research and have distinctive strengths. Many surveys are easy to run, relatively inexpensive, and efficient to describe large populations in comparison to other research methods. According to Thomas, Nelson, and Silverman (2005), a survey is a useful tool to obtain specific information and determine present practices of multiple fields with a specified population in education, psychology, sociology, and physical activity. Through a survey, we can understand how, why, and what people think of in a particular situation from their responses. These data provide fundamental information to build a vital framework for future study, and also play a significant role in ascertaining conceptual constructs to build strong theory and models. Due to these benefits, the use of a survey in research has been widely extended from an observational study to an experimental study, as well as to make population inferences and a causal inference in a range of theoretical and empirical contexts.

Paper and pencil questionnaires are a common method to conduct surveys. In spite of the benefits, it has been reported that there are limitations associated with the paper-based survey. For instance, sensitivity of missing values and response rates might be considered as one of the general limitations. A diversity of strategies have been suggested to cope with the limitations, such as reducing the length of the questionnaire, improving survey design, providing motivational incentives (Comley, 2000; Lander, Wingenbach, & Raven, 2002), and a strategy sending multiple follow-up mail was the most widely used. This strategy resulted in better response rates.
increased by continuously encouraging participation. However, multiple follow-ups of paper and pencil surveys affect cost inefficiency.

The possibility of conducting a survey using the internet has received remarkable attention from researchers in diverse professions due to the widespread of personal computers and internet use. A large number of studies have advocated internet-based surveys because of the positive aspects and unique capabilities compared to the paper and pencil survey. The advantages could be summarized in four ways. First, it brings simple approaches to incorporate multimedia functions, including appealing graphics, sound, and skip logic (Comley, 2000; Kwak & Radle, 2002). It could effectively motivate participants to complete the survey. Second, it makes a self-administered system and short data collection-analysis-presentation cycle (Norman, Sallis, & Gaskins, 2005). Third, it could save money and time because of electronic responses and almost instantaneous results across wide geographical borders, even continents (Comley, 2002; Coomber, 1997; Fricker & Schonlau, 2002; Jones, & Pitt, 1999; Lander et al., 2002). Lastly, internet-based surveys tend to have lower rates of average responses unanswered, indicating good data quality, than mail-based surveys due to the multimedia functions above (Couper, Blair, and Triplett, 1999; Schaefer and Dillman 1998; Stanton 1998).

Past studies reported the inefficiency of internet-based surveys and raised some concerns, such as low response rate and sampling bias (Coomber, 1997; Kwak & Radler, 2002). According to Butcher, Perry, and Atlis (2000), some participants might be uncomfortable with computers and consequent awkwardness, and they can not yield true responses in the internet-based survey. Comley (2000) also mentioned that
infrequent internet users may be less likely to fill out the survey because of insufficient internet experience. Fricker and Schonlau (2002) compared response rates between internet- and mail-based surveys from 12 studies, and the results showed that internet-based surveys did not achieve response rates equal to mail surveys except for only one study out of 12 studies. However, technologies in cyberspace have been significantly developed and the use of the internet has been substantially increased over recent years. Stone (2005) said “75 percent of Americans use the internet and spend an average three hours a day online.” According to Day, Janus, and Davis (2005), households with a computer and internet access in the U.S. substantially increased from 2000 to 2003 by 10.8% on computer access and 13.2% on internet access respectively. Thus, comparison between mail-based survey and internet-based surveys need to be reexamined due to the higher access rates of computers and the internet. Namely, there needs to be a study to examine the quality between paper- and web-based survey modes.

According to Raziano, Jayadevappa, Valenzula, Weiner, and Lavizzo-Mourey (2001), the nature of the sample or target population, survey conditions, and questionnaire contents can have profound implications on response rates. Even though either internet- or mail-based surveys have been more validated in some settings, this does not guarantee their validity and appropriateness for all applications (Butcher et al., 2000). Thus, it is important to identify which survey mode is more effective to maximize response rates and completeness, as well as minimize cost and time in a particular setting.
Methods

Participants

The study sample consisted of 131 educators teaching physical education in elementary and secondary schools across the Northwest of the United States (States of Idaho, Montana, Oregon, Washington, and Wyoming). Table 3.1 summarizes the distribution of participation in each state. Gender proportion of responses was 40.5% (male) and 57.3% (female) respectively, and 2.3% of teachers did not answer their gender. Age of participants ranged from 23 to 68 years (M = 41.48, SD = 11.28) and range of teaching experience was from 1 year to 35 years (M = 12.75, SD = 9.92). Participants received their highest degree between 1964 and 2008 (M = 1995, SD = 10.73), and 66.4% of teachers had more than one teaching certification, and approximately one fourth of the teachers (18.3% out of 66.4%) reported that they have multiple responsibilities other than physical education, such as health education.

<table>
<thead>
<tr>
<th>Table 3.1 Distribution of participation in each State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idaho</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>12.2%</td>
</tr>
</tbody>
</table>

Instruments

The questionnaire was developed to assess readiness of educators teaching physical education to implement Evidence-based Education (EBE). The questionnaire was comprised of five sections and laid out using multiple choices, single textbox, and rating scale questions and statements related to self confidence, decision making, and strategies in using EBE.
For a mail-based survey, a four-page-long booklet-size questionnaire, using the Adobe Illustrator software, was designed. General directions for the survey were included on the first page with the first section, and specific directions were given under each section. The second section was on the second page, and the third and fourth sections were positioned together on the third page. The entire fourth page was devoted to the last section. To improve quality of survey design, ivory color and heavier paper were used. To develop an internet-based version of the survey, Surveymonkey, which is one of the popular web survey design programs, was used. The internet-based questionnaire was posted on the web using the same question wording, directions, sequences, and skip patterns as the paper questionnaire in order to minimize the errors from delivery of the contents of the paper questionnaire. The web questionnaire consisted of 11 pages and 7 to 15 questions/statements were included on each page. A written statement, including the key elements of consent information, was provided on the first page of the web-based questionnaire. A progress bar indicating both pages and percentages completed was shown at the bottom of each page.

The prototype questionnaire was evaluated by eight experts: five university professors who have Ph.D.s in the field of exercise science and public health, and three physical education teachers who are currently teaching physical education in public schools. The experts were asked to review the questionnaire on the various aspects, including wording, format, and layout. Structure, directions, and statements/questions in each section were corrected or eliminated based on the feedback of the experts. The order of questions was changed, and specific words, such
as terminologies in physical education, were added to a couple of questions to help participants clearly and easily understand and answer the questions.

Survey administration

A total of 980 educators who were teaching physical education were randomly selected by stratified random sampling method. Selected educators were randomly divided into a web-based sample (n = 580) and a mail-based sample (n = 400). Because of the previous literature suggested that response rates of web-based surveys are usually lower than mail-based surveys, a different number of individuals were recruited for each mode in order to have a similar response rate between the two modes. A complete mailing list, including email addresses, was obtained in elementary and secondary schools in Northwest regions (States of Idaho, Montana, Oregon, Washington, and Wyoming) by internet and telephone search. A random number generator was used to randomly select an educator in the internet search if a school had more than two educators teaching physical education. In the telephone search, a school secretary was asked to randomly select a teacher if his/her school had more than two educators teaching physical education.

Invitation letters were sent out to a web-based sample group to provide pre-notification and a brief introduction to the questionnaire. The selected teachers were asked to participate in the internet-based survey. For the mail-based sample group, the initial questionnaire packets, including the questionnaire, a cover letter (invitation letter), and return envelope, were sent out. Each teacher was asked to complete and return the paper and pencil questionnaire. The cover letter contained a written statement regarding consent information of this study. After five days, an email
invitation, including a web link, was sent out to internet-based survey participants in order to stress the importance of their participation and encourage them to access the internet-based survey. Approximately two weeks after the initial mailing, follow-up packets, including the same materials as the initial mailing, were sent to teachers who had not completed and returned the mail-based surveys. Email follow-up reminders were sent to those who had not responded after another six days. Responses from the two survey modes were collected for approximately four weeks in total, and responses over four weeks were excluded from the data collection process. A participant from the internet-based survey and a participant from the mail-based survey each received a $100 gift card by random drawing as an incentive.

Analysis

The demographic data were analyzed using frequencies and percentages overall for each survey mode in order to compare the survey responses between the mail- and internet-based surveys. ANOVAs and t-tests and were used to find any significant differences between two surveys. Response rates were calculated by total number of usable responses/ (total sample size-undelivered) (Mehta, & Sivadas, 1995). A total of 65 emails and 12 questionnaire packets were undelivered and these undeliverables were not included in calculation of the response rates. Response completeness was defined as the average number of questions unanswered (Tse, et al., 1995) and calculated by counting the average number of items unanswered in the instruments of the two survey modes. The response speed was analyzed by the number of days between the date the survey was sent out and the date it was received. Average cost per response was calculated for the two survey modes. The average cost per
response was computed and compared across the two groups. Two sample t-tests of log transformations were used to compare the group differences on response completeness and response speed, since the original data were skewed on the right side (all positive values) and there were a lot of outliers in different spreads. Original data were transformed through ‘log (response completeness or response speed + .05)’ because both response completeness and speed data included a lot of 0s.

Results

Demographic characteristics of participants overall and for each survey mode are shown in table 3.2. Data reported that 56.8% and 57.5% of female teachers in each mode participated in the surveys. Number of years teaching physical education ranged from under 5 years to over 31 years. Teachers who have master’s degrees made up the largest group in both survey modes, and 62.1% of teachers reported that they have master’s degrees compared to 33.4% of bachelor’s degrees in the internet group. Other additional types of degrees were included (e.g. plus 45 credits, APE credential, and Administration credential). Primary responsibility of teachers in both surveys was physical education teacher (81.7%) and 1.5% of teachers reported that they have other primary responsibilities, such as health education teaching. More than half of the participants were working in elementary schools. ANOVAs showed no significant differences on age ($M = 42.98$ years in the mail group and $M = 40.72$ years in the internet group, $p > .05$), number of years teaching physical education ($M = 13.00$ years in the mail group and $M = 12.64$ years in the internet group, $p > .05$), and the highest degree between two groups with $p > .05$. 
Table 3.2 Demographic comparisons of respondents by survey modes

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<th>Internet n</th>
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<td>%</td>
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<td>19.8</td>
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<td>6</td>
<td>6.9</td>
<td>7</td>
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</tr>
</tbody>
</table>

Response Rates

Unexpectedly, the internet-based survey mode showed a higher response rate than the mail-based mode. After initial mailing, 3.9% of mail group and 8.9% of
internet group responded, and 7.5% and 8.0% of teachers in each group returned the questionnaire after follow-ups. Table 3.3 describes actual number of responses and percentages returned from both survey modes overall and after initial mailing and follow-ups.

<table>
<thead>
<tr>
<th></th>
<th>Mail</th>
<th>Internet</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N</strong></td>
<td>44</td>
<td>87</td>
</tr>
<tr>
<td><strong>%</strong></td>
<td>11.3</td>
<td>16.9</td>
</tr>
<tr>
<td><strong>Overall</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Initial mailing</strong></td>
<td>15</td>
<td>46</td>
</tr>
<tr>
<td><strong>%</strong></td>
<td>3.9</td>
<td>8.9</td>
</tr>
<tr>
<td><strong>Follow-up</strong></td>
<td>29</td>
<td>41</td>
</tr>
<tr>
<td><strong>%</strong></td>
<td>7.5</td>
<td>8.0</td>
</tr>
</tbody>
</table>

**Table 3.3 Response rates comparison of mail- and internet-based survey modes**

*Response completeness*

Overall, approximately 45% of participants fully responded to all items including a demographic section and the average number of unanswered items was 11.69 (53.3% in mail-based group and 41.7% in internet-based group). Table 3.4 shows the average number of unanswered items and standard deviations overall and for each group. A t-test on log transformation demonstrated that the internet-based group tended to leave significantly more items unanswered than the mail-based group (t = 7.63, p <.01). In contrast with previous literature, this study found that the mail-based survey had lower average of unanswered items, indicating good data quality, than the internet-based survey.

<table>
<thead>
<tr>
<th></th>
<th>Mean number of missing items</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Overall</strong></td>
<td>11.58</td>
<td>20.98</td>
</tr>
<tr>
<td><strong>Mail</strong></td>
<td>5.43</td>
<td>13.31</td>
</tr>
<tr>
<td><strong>Internet</strong></td>
<td>14.69</td>
<td>23.15</td>
</tr>
</tbody>
</table>

**Table 3.4 Average number of unanswered items and standard deviation**
Response Time

Response speed across initial and follow-up mailing/emailing is summarized in table 3.5. For initial mailing, internet-based survey was tremendously faster than mail-based survey, but the gap was reduced to three times in the follow-up phase. The t-test provided evidence that overall response speed of internet-based survey is significantly faster than mail-based survey (t = 8.89, p<.01).

Table 3.5 Response speed comparison of mail- and internet-based survey modes

<table>
<thead>
<tr>
<th></th>
<th>Mail</th>
<th>Internet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>10.61 days</td>
<td>1.59 days</td>
</tr>
<tr>
<td>Initial mailing</td>
<td>8.67 days</td>
<td>0.2 days</td>
</tr>
<tr>
<td>Follow-up</td>
<td>11.62 days</td>
<td>3.24 days</td>
</tr>
</tbody>
</table>

Administration costs

Total costs of mail- and internet-based surveys were $963 and $395, and the average cost per response was $21.89 and $4.54, respectively (see Table 3.6). It was revealed that the cost of the mail-based survey is four times of internet-based survey. Total survey cost was analyzed with survey preparation, administration, follow-up, and gift cards costs. Based on the total cost, average survey cost per response in both survey modes was calculated. First, for mail-based survey, there was no cost in the survey preparation. Survey administration included printing (questionnaires, invitation letters, large and reply envelops with institution letterhead), postages, and supplies including address labels and envelop sealing glues. Follow-up items were the same as the initial mailing, but the number of printing and postages was reduced.

Second, for internet-based survey, $20 was paid for monthly use of the online survey tool (SurveyMonkey.com). Four research assistants with reasonable computer
skills to make an email address list were employed and paid $20 per person. A telephone card with $40 was purchased to make long distance calling to teachers who did not have email address on the school website. Survey administration included printing (invitation letters and regular envelops), postages, and mailing supplies. There was no cost for email follow-up.

A gift card for $100 was given to a respondent in each survey mode as an incentive for survey participation. Author’s labor (e.g. internet and telephone searches, data management including input and reduction, survey preparation such as web-survey construction, and survey administration) and internet connection costs were not included.

Table 3.6 Cost comparison of mail- and internet-based survey modes

<table>
<thead>
<tr>
<th></th>
<th>Mail (n = 400)</th>
<th>Internet (n = 580)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survey preparation</td>
<td>$0</td>
<td>$140</td>
</tr>
<tr>
<td>Survey administration</td>
<td>$463</td>
<td>$155</td>
</tr>
<tr>
<td>Survey follow-up</td>
<td>$400</td>
<td>$0</td>
</tr>
<tr>
<td>Gift cards</td>
<td>$100</td>
<td>$100</td>
</tr>
<tr>
<td>Total</td>
<td>$963</td>
<td>$395</td>
</tr>
<tr>
<td>Average cost per response</td>
<td>$21.89 (n = 37)</td>
<td>$4.54 (n = 87)</td>
</tr>
</tbody>
</table>

Discussion

The purpose of this study was to identify an effective survey method to assess a teacher’s readiness for changing teaching behavior in physical education settings. A paper and pencil based survey has been a traditional survey method, but it was time and cost inefficient. As a strategy to overcome the disadvantages of the mail-based survey, the internet-based survey has been introduced due to unique and positive aspects. In spite of the benefits, past studies have shown that internet-based surveys tend to have lower response rates than mail-based surveys. This concern could be a
critical part in that response rates greatly influence meaningful interpretation, which means less bias and more confidence in survey results (O’Rourke, 1999). However, technologies in cyberspace have been incredibly developed and internet and computer use has been widely distributed throughout the world. That is to say, a majority of people can easily access the internet and computer more than in the past. In addition, survey results, including response rates, are entirely dependent on the nature of sample, survey conditions, and questionnaire content. Therefore, it should be reinvestigated which survey mode is a more effective method in certain contexts. Critical factors (response rates, response completeness, response speed, and costs) that determine effectiveness of a survey method were compared between mail- and internet-based surveys in this study.

Response rates

In terms of response rates, it was revealed that an internet-based survey was a more effective method than a mail-based survey in a physical education population. That was an interesting finding in this study because low response rates have been the biggest concern of internet-based surveys. This high response rate could be explained by two reasons. The increase of computer distribution in schools and increase of internet use in educational circumstances might be the first reason, particularly physical education settings. Planning lesson plans using the internet could be one of the examples for this case. Second, the physical education group may not like traditional paperwork. For instance, the return process of an internet-based survey is much easier than a paper and pencil survey. By just clicking the reply button on the web, it can be done. However, overall response rates were low in both survey modes
compared to other comparison studies. The lengthy questionnaire (75 items on 4 pages in mail-based survey and 11 pages for internet-based survey) and survey timing (end of the schools year and close to summer vacation) might be the main reasons for the low response rates. Short questionnaires and appropriate survey timing, such as the middle of the school year, should be considered to increase overall response rates and to compare two survey modes with more samples in future studies.

**Response completeness**

Data quality can be explained by the amount of effort and thought that respondents devoted in completing a questionnaire (Tse et al., 1995). However, this study did not include open-ended items, which assess considerable feelings and ideas of respondents. Thus, response completeness was employed as a way to assess data quality on two survey modes. Unlike previous studies, the results of this study showed that the internet-based mode had significantly higher missing items than the mail-based mode (14.69 vs. 5.43). These two survey modes had exactly the same number of items with the same wording and directions. The only difference between the two modes was the number of pages used for designing lay-out on the paper (4 pages) and web (11 pages). There are two possible reasons for this result. First, physical educators, the target population of this study, may not have enough computer skills because physical education is mainly taught in a gymnasium. This unique teaching environment may not provide enough motivations to improve computer skills, and as a result physical educators may be unfamiliar with the internet-based format due to the lack of opportunities to use a computer in physical education classes. Second, the internet-based survey may have some problems, especially in terms of the length. In
contrast with 4 pages of the mail-based survey mode, the internet-based survey was
designed on 11 pages. The main purpose of the 11 pages was to save time from mouse
scrolling down when a participant took a survey. Three of the 11 pages were devoted
to constructing skip logics which is one of the special characteristics of internet-based
surveys. Despite the initial intentions, however, the survey participants might think
that the 11-page-long survey is time-consuming work. In order to improve response
completeness of the internet-based survey mode, future studies should consider the
survey design with clear instructions, easy directions, and more motivational factors,
such as using multimedia functions (e.g. graphics and sounds), in minimum pages.

Response speed

As expected, response time of the internet-based mode was significantly faster
than the mail-based mode. An interesting finding on response speed was the different
time periods between the initial mailing and the follow-up phases. The response speed
of the mail-based mode after initial mailing (8.67 days) was not much different than
the follow-up mailing (11.62 days). However, the time difference of the web-based
mode was enormous between after initial emailing (0.2 days) and follow-up emailing
(3.24 days). It can be explained by the fact that respondents of the internet-based
survey tend to be much less interested in the follow-up email than respondents of the
mail-based survey. This result suggests that subjects participating in an internet-based
survey should be motivated to immediately respond in an initial email invitation.

Another concern in regard to this difference may be due to consistency of a spam
filtering system. If the initial email was blocked by a filtering system or a participant,
the follow-up email would be automatically blocked. Future studies using the internet-
based modes may consider strategies to improve response speed of the follow-up emailing as close as the initial response speed (e.g. trustworthy email title and address domain to prevent spam filtering).

**Costs**

Results showed that the internet-based survey is a more cost-efficient method than the mail-based survey. Most of the efficiency regarding survey costs was derived from survey administration and follow-up since the internet-based mode could save costs of printing, mailing, and data entry which are huge parts of a paper and pencil based survey. Conversely, cost of internet-based survey preparation was higher than the mail-based survey. Although the labor cost of the author was not included due to the complexity of calculation, tremendous efforts and time was devoted to obtain an email list by internet searching and telephone calling in the survey preparation period. According to Raziano et al. (2001), the process of obtaining email addresses through mailing address lists is extremely labor-intensive although most of addresses are available by internet searching. In order to more exactly compare the costs between two survey modes, future studies should make efforts to collect data regarding survey costs by employing systematic strategies.

The findings of this study clearly support that the internet-based survey is a more efficient survey method in terms of response rate, response speed, and costs to assess a teacher’s intention for changing their teaching behavior. This result could be representative to physical education population because the random mechanism was used in the process of sample selection. However, there are still concerns that the future studies have to solve. First, there is a necessity to improve overall response
rates of the internet based mode. Second, certain strategies should be developed to prevent missing data, which limit their generalizability. Third, labor cost should be systematically recorded to exactly calculate entire cost and cost per response.
References


CHAPTER 4

Each research aim of the two manuscripts and future research directions are summarized in this chapter.

Research Conclusions

Research Questions for Development of a Scale

1. Did the developed scales about self-efficacy, decisional balance, and process of changes have the adequate item discrimination function and internal consistency?

For the self-efficacy (SE) measure, 13 out of 14 items demonstrated very good discrimination value (more than .40) and the one item (.34) indicated good value. Among decisional balance (DB) measures, nine items indicated very good, two good (.32 and .36), one acceptable (.23), and two items (.15 and .19) had poor discrimination values. Processes of change measures showed 27 very good, two good (.30 and .36), and one acceptable (.28) discrimination values. Overall, only two negative items, which had poor discrimination values in decisional balance, were eliminated. Cronbach’s alpha of all sections indicated very good internal consistency (more than .90), except for the cognitive processes of change (POC) measure (.87) and the negative decisional balance measure (.61). Items in acceptable ranges could be revised to improve item dissemination value and internal consistency.
2. Were the internal structures of the scales about self-efficacy, decisional balance, and processes of change congruent with the theoretical framework?

Three structural models on SE, DB, and POC measures revealed enough levels of factor loadings (.47 to .76 on SE, .65 to .85 on positive DB, .11 to .86 on negative DB, .36 to .77 on cognitive POS, and .32 to .78 on behavioral POS). Goodness of fit indices partially supported the proposed structural models. It was demonstrated that CFI was fit to DB (.93) model. \( \chi^2/df \) was fit to DB (1.62) and POS (2.22) models, but was not fit to a SE (4.21) model. DB model also satisfied the RMSEA fit index (.07).

3. Were there the relationship of the stage of change to self-efficacy, decisional balance, and processes of change?

There were no significant differences in relationships of stage of change with SE, DB, and POS. A one-way ANOVA revealed no significant differences (F (2, 110) = .11, \( p > .05 \)). MANOVA on decisional balance by stage found that there are non-significant differences (Wilks’ Lambda = .96 and F (2,111) = 1.01, \( p > .05 \)). POS also did not have significant relationship with stage of change from MANOVA (Wilks’ Lambda = .94, F (2,111) = 1.69, \( p > .05 \)).
Research Questions for Survey Method

1. Were there differences in response rates between mail- and internet-based surveys?

   The total number of returned responses was 44 for the mail-based survey and 87 for the internet-based survey. Results showed that overall response rates of mail-based mode and internet-based mode were 11.3 % and 16.9% respectively.

2. Were there differences in response completeness between mail- and internet-based surveys?

   It was revealed that participants of the mail-based survey did not respond to 14.69 items on average and participants of the internet-based survey did not respond to 5.43 items on average. A t-test showed that the internet-based group tended to leave a significantly more items unanswered than the mail-based group (t = 7.63, p <.01).

3. Were there differences in response speed between mail- and internet-based surveys?

   The finding on the response speed showed that the internet-based survey is significantly faster than mail-based survey. The t-test supported this finding with t = 8.89, p<.01.

4. Were there differences in administration cost between mail- and internet-based surveys?

   It was revealed that the cost of the internet-based survey was clearly cheaper than the mail-based survey. The average cost per response of the mail-based mode was $21.89 and internet-based mode was $4.54.
Future Research Directions

A measurement system for evidence-based physical education was evaluated through this study in two ways. First, psychometric properties were examined to develop a concrete measure and to improve internal structures on the new measure in order to assess physical educators’ readiness for changing their teaching behaviors that teach students with disabilities. Second, effectiveness of survey methods was examined to indentify the most appropriate survey mode in order to assess teacher’s intention toward evidence-based physical education for students with disabilities.

Perfect psychometric properties for certain survey instruments never exist. However, future studies should improve the algorithm in stage of change to appropriately distribute participants into each stage without sampling bias. This effort could provide a base to demonstrate significant relationships of stage of change to other TTM components. Further item corrections and eliminations would be recommended to enhance item discrimination functions and build more concrete structural equation models with better fits from goodness of fit indices. Last, future studies with a nation wide sample would be helpful to establish more solid psychomotor properties through a cross validation procedure.

In terms of response rate, response speed, and cost, it was revealed that the internet-based survey is the more effective survey method to assess physical educator’s readiness for change. However, response completeness was lower than the paper-pencil survey. Thus, it is recommended that future studies should concentrate on developing survey design and format on the web. A variety of unique functions, such
as items visualized with sounds and skip patterns, would be helpful to effectively motivate participants and save time.

Ultimately, this measurement system (a newly developed instrument and internet-based mode) could be used to assess a physical educator’s intention for change in the future studies. This process would be a key role in providing physical educators’ stage of change toward evidence-based physical education for students with disabilities.
BIBLIOGRAPHY


Evidence-Based Practice in Adapted Physical Education

Jooyeon Jin
Abstract

Evidence-based practice (EBP) in adapted physical education (APE) is defined as the best practice of integrating individual teaching strategies with the best available evidence to satisfy individuals’ unique characteristics and special needs in physical education settings. EBP has a number of benefits, such as gaining confidence in decision making, minimizing the waste of time and money, and improving problem solving skills. In addition, the IDEA and the NCLB are currently calling for educational professionals to implement evidence-based education. However, EBP has not been well implemented in APE and one of the possible reasons is a lack of appropriate understanding of EBP. This paper addresses (a) the meaning of EBP, (b) the classification of evidence, and (c) possible strategies to successfully implement EBP. Implementing EBP should help APE professionals to provide the most appropriate educational services to students with disabilities.
The term “Evidence-Based Practice” (EBP) has become a popular topic in conferences, articles, and professional settings in medicine, nursing, agriculture, and engineering (Slavin, 2003; Bernard-Opitz, 2006). Like other disciplines, the movement toward EBP in education is gradually promoted to improve educational outcomes. According to Corcoran (2003), more and more school districts attempt to build evidence-based education cultures. However, EBP is not a popular concept in physical education yet. Although a stronger emphasis on the scientific bases has been placed in the context of physical education, the gap between research and practice still exists (Kneer, 1986; Knudson, 2005). Particularly, there are needs for specific strategies based upon evidence for teaching students with disabilities in inclusion or adapted physical education (APE) classes rather than merely adding equipment or decreasing class size (Broadhead, 1988).

There are two main reasons that EBP should be implemented in APE classes. First, federal legislation emphasizes the importance of promoting EBP in education. The Individuals with Disability Education Act (IDEA) and the No Child Left Behind Act (NCLB) underline the importance of educating students with and without disabilities based upon scientific evidence. IDEA, passed by Congress in 1997, has provisions for “synthesizing useful research and other information relating to the provision of services to children with disabilities, including effective practices” (U.S. Congress, 1997). Moreover, IDEA, amended in 2004, calls for education professionals to implement academic and behavioral interventions based on quality scientific evidence. According to Slavin (2002), NCLB requires that teachers implement best practices based on scientific evidence in their classrooms, and the phrase
“scientifically based research” is mentioned 110 times in NCLB in order to show the importance of evidence.

Second, EBP enables teachers to have effective teaching and problem solving skills. According to the National Council on Disability (NCD), teachers need to not only learn new instructional skills to help students with disabilities learn at higher standards, but also change their own beliefs and attitudes toward teaching students with disabilities (2004). Through EBP, teachers gain confidence in decision making, so it is easier to justify decisions to students and to communicate with other teachers and parents (Cutspec, 2004). Furthermore, EBP helps teachers independently and effectively overcome a variety of challenges which arise in classes, because teachers can answer their own specific questions by external information they found from reading articles, expert consultation, and professional conferences. Therefore, teachers implementing EBP could minimize wasting time and costs, as well as reduce wide teaching variations, thus improving the quality of education toward the best practice. Teachers may regularly adjust their practices and enhance their abilities to deliver effective educational interventions and supports by developing their own instructional and management skills, such as effective teaching, behavior management, and problem solving skills (Strain, & Dunlap, n.d.).

A number of studies and federal legislation emphasize the significance and the necessity of EBP and a positive movement toward EBP is rising in a range of educational domains. However, EBP has not been well implemented in most classes. According to Slavin (2002), “The change of educational practice resembles the pendulum swings of taste characteristic of art or fashion rather than the progressive
improvement characteristic of science and technology” (p. 16). This may be due to 
EBP being an unfamiliar concept to a large number of educators. Some may have 
skepticism because they believe that EBP does not have utility in educational settings 
due to the complexity of reflecting the outcomes in education systems. These 
objections may be mainly a result of the lack of appropriate understanding of the 
central notion of EBP. This paper focuses on three objectives: (a) the meaning of EBP, 
(b) the classification of evidence, and (c) possible strategies to successfully implement 
EBP. The author believes that this paper can help professionals in APE successfully 
implement EBP and deliver the best practice for students with disabilities.

Key concepts of EBP

There are multiple definitions for EBP and each has been suggested to reflect 
an inherent circumstance. In the medical field, Sackett, Rosenberg, Gray, Haynes, and 
Richardson (1996) suggested that evidence-based medicine means integrating 
individual clinical expertise with the best available external clinical evidence from 
systematic research. “EBP in the medical profession is defined as a process of 
combining clinical judgment with the best evidence regarding tests and measures, as 
well as interventions” (Balsor, Beattie, Berk, et al., 2000, p.99). For the early child 
educational profession, Buysse, Snyder, and Winton (2006) proposed that EBP is 
essentially a process of empowering professionals and families to integrate various 
sources of knowledge to make appropriate decisions that directly benefit young 
children and families. EBP in education is defined as the process of searching and 
critically appraising research and evidence in order to determine its relevance in their
In APE, EBP could be defined as the best practice of integrating individual teaching strategies with the best available evidence (e.g. internet, articles, experts, professional conferences, and/or, in-service training) to satisfy individuals’ unique characteristics and special needs in physical education settings.

EBP is a three-way process. In order for EBP to be used effectively, (a) researchers must create appropriate evidence, (b) it has to be effectively disseminated to practitioners, and (c) the practitioners, most importantly, must critically think and make the best decision for its practical application. More details are discussed in the following sections.

Creating evidence. Researchers have a responsibility to establish sound generalizable evidence where existing evidence is lacking, questionable, or uncertain. Lavay and Lasko-McCarthey (1992) emphasize the importance of quality research to expand the scientific body of knowledge in APE. IDEA also has provisions for conducting evidence-based research to improve educational practice and professional development, such as instructional methods, curriculum, and tools (NCD, 2004). Although numerous studies have been conducted and contributed knowledge to bridge practice and research, there is still a scarcity of quality research that meets the educational needs of students with disabilities. That is to say, there are many teaching strategies that have been proposed and advocated, but the effectiveness of the ideas has not been well examined. The field of APE still has a variety of questions we need to answer, and creating new knowledge by conducting research would be the best way. The research, in particular, should be directly related to teaching students with
disabilities in APE settings (Broadhead, 1988). To be specific, the following questions would be examples of what should be answered by research: How can physical educators make instructional and curricular modifications for students with intellectual disabilities in inclusion-based physical education classes? How can physical education teachers increase physical activity levels of a student with a traumatic brain injury using psychological approaches in inclusive physical education? And, how can we change the teaching behavior of general physical educators toward students with autism? Additionally, collaborative efforts with specialty areas, such as biomechanics, exercise psychology, and pedagogy, will shed light on research questions that the APE professional in the past could not answer alone (Lavay & Lasko-McCarthey, 1992). When researchers make ongoing efforts to create research-based evidence from well-designed studies, APE will get a firm stand to move forward.

*Disseminating evidence.* Dissemination of knowledge and intervention strategies is as important as the research itself, and research findings need to inform practice to eliminate health disparities and improve the lives of people with disabilities (Krahn, Putnam, Drum, & Posers, 2006). According to NCD (2004), one of the challenges to implementing EBP is how to turn available evidence-based research into practice. Even when researchers developed effective intervention strategies to include children with disabilities, practitioners may not know where effective research-based evidence can be found, because of a lack of dissemination of evidence and communication with researchers. Research exists to find truth on some phenomenon and generalize them by establishing evidence. However, without efforts and strategies to disseminate evidence, the research itself would be abandoned. On the other hand,
disseminating evidence includes training practitioners about how to use research findings. Kneer (1986) investigated the size of the instructional gap between theory and practice in physical education by determining what percent of instructors practice recommended procedures. One hundred twenty eight teachers were randomly selected from 20 Illinois secondary schools and were interviewed via a questionnaire to obtain evidence relative to the perceived gap in the use of instructional theory. The results showed that 42% of participants felt that instructional theory is not necessary for practice. Among a range of possible reasons for this, the most considerable reason would be lack of in-depth understanding regarding the theory derived from lack of training about how to use it. Therefore, prior to emphasizing the use of research-based evidence to practitioners, researchers have to consider effective strategies not only for disseminating evidence, but also for enhancing the perception of practitioners about the value of evidence by providing consistent educational opportunities to teachers.

*Implementing evidence.* Implementing evidence is the most important foundation among the three elements of EBP. Practitioners have to actually utilize existing evidence from worldwide literature (Davies, 1999). If a consumer does not buy a valuable product, the value of the product would be useless. If practitioners appropriately implement the evidence to make the most effective decision, the research-based evidence can shed light on APE because ideal or perfect evidence fit into a specific situation (Balsor et al., 2000). However, practitioners should take the first step to critically think about what would be the best evidence based on their particular conditions and environments before making a choice about the evidence. If creating evidence is the researchers’ role, making a choice in the evidence pool is the
practitioners’ role and critical thinking skills could give practitioners a chance to implement more quality evidence. When the relationship is appropriately integrated, EBP might be effectively implemented. All in all, educational research relies critically on relationships between researchers and those engaged in professional practice, including teachers, administrators, university professors, and school board members (Shavelson & Towne, 2002).

Classification of evidence

In order to successfully implement EBP, it is important to understand what kind of evidence is appropriate and where it comes from. All evidence is not equal and there is a hierarchy when applying evidence (Balsor et al., 2000). The hierarchy of evidence may help practitioners to critically appraise and utilize the evidence from the literature, internet, and experts. Because not all research designs are appropriate for all aspects of practical condition, different levels-of-evidence should exist (Glaros, 2003). (Figure A.1 presents the hierarchy of evidence.) Moreover, a thorough understanding of the hierarchy could play a pivotal role in developing an ability of practitioners to distinguish the best evidence-based product. To be specific, NCD (2004) illustrated that “curriculum marketers pushed school districts into believing that their products are evidence-based, and unfortunately practitioners are convinced by the sales people” (p. 68). If the practitioners were aware of a way to distinguish whether the product is evidence-based or not, those kinds of problems would be less likely.
A key argument in developing EBP is the uncertainty as to what counts as evidence (Davies, 1999). It is important to clarify the meaning of the hierarchy of evidence, and specifically the meaning of the strongest evidence (the systematic review of randomized control trials), and the weakest evidence (empirical evidence including expert opinion). According to Glaros (2003), the systematic review of randomized control studies is the highest level and the most ideal source of evidence in the medical profession because the systematic review summarizes and combines the results of several studies to minimize both systematic and unsystematic errors. A number of researchers, policy makers, and the U.S. Department of Education also have recently been insisting on a substantial increase in the use of randomized designs in evaluations of education programs because randomized control trials can reduce the chance of confounding factors that may bias the results (Slavin, 2003).

In the education profession, issues about the quality of scientific research and disagreements about the appropriate types of scientific information that are acceptable
as evidence have emerged (Odom, Brantlinger, Gersten, Horner, Thompson, & Harris, 2005). It is true that randomized experiments can be influential, but they are very rare in education (Slavin, 2003). Furthermore, research regarding EBP for students with disabilities has been lacking (NCD, 2004). One of the reasons for this might be challenges in applying randomized experiments of interventions to entire classrooms, which is sometimes impossible (Slavin, 2002). The difficulty in securing large and homogenous samples also leaves many research questions in APE unanswered (Lavay & Lasko-MaCarthey, 1992). The National Research Council (NRC) suggested that science in education is comprised of different types of questions and also stated that different methodologies are needed (Shavelson & Towne, 2002). Though the experimental study is important for EBP, more qualitative and naturalistic research methods, such as ethnography, detailed observations, and face-to-face interviews, would be required in that the consequences of educational activities on students’ and parents’ sense of self and social identity are needed (Davies, 1999).

As mentioned above, EBP is a process. Evidence alone cannot play a vital role in implementing EBP, even when it comes from strong systematic reviews of randomized control studies. The hierarchy of evidence may not fit in many APE settings. When practitioners implement a variety of practices with appropriate evidence regardless of the level, authentic and reliable evidence eventually would be recreated in APE and the real hierarchy of evidence would be established by practitioners. The hierarchy of evidence is just a framework which plays a role in guiding practitioners and researchers to understand the type of evidence, unless the evidence is applied to the educational field. Fortunately, educational research has been
enhanced, and educational researchers have acknowledged the value of mixing methodologies to provide a complementary set of information that would more effectively inform practice than a single method (Odom et al., 2005).

**Possible strategies to successfully implement EBP in APE**

According to Odom et al. (2005), scientific research-based educational practices are not being used in schools due to a long-standing discussion of the distance between researchers and practitioners. In spite of those challenges, a variety of strategies are available to bridge the gap between evidence and practice. If these suggestions apply to both evidence and practice realms, along with researchers and practitioners trying to be actively and positively devoted to their duty and responsibility, together, the ideal EBP will eventually be realized.

*Strategies for creating evidence.* Most experimental research is designed to see if an intervention is effective or not by manipulating variables. However, judgment in practice is always required in individual cases, and randomized controlled trials may be impractical or inappropriate to satisfy individual needs in APE (NCD, 2004). Fleischman (2006) proposes to explore ways to strengthen the connection between research and practice, learn more about using scientific approaches to improve learning, and consult credible, timely, and regular evidence reviews. Also, EBP can attempt to bridge this gap by involving practitioners in building the evidence base (Buysse et al., 2006). To improve EBP in physical education, Knudson (2005) emphasizes more research work to elevate the status of applied research, encourage interdisciplinary research, and provide integrated and accessible research reviews. In
particular, to solve the lack of time for educational policy makers, research summaries that were tailored to different user groups and disseminated through a variety of channels were recommended (Huang et al., 2003).

*Strategies for disseminating evidence.* “Even when research is available, it doesn’t automatically translate into practice in the classroom” (NCD, 2004, p. 75.). To disseminate research-based evidence to practitioners, the role of researchers is important, but a third-party could play a significant role. According to NCD (2004), practitioners need third-party, unbiased organizations and individuals (e.g. dissemination specialists) to provide evidence-based information for use in the practical field. In the APE field, there are two organizations administered by third-parties which practitioners can easily access. PE Central (http://www.pecentral.org/) provides research evidence to practitioners as a third-party in physical education communities. PE Central has a variety of categories regarding teaching physical education. APE is one of the categories on the contexts and research findings for APE are provided by a dissemination system. If practitioners select a type of disability they want to find in the system, it shows a list of research articles based on the particular disability type and research summaries submitted by APE professionals. The website (http://www.ncpad.org/) of the National Center on Physical Activity and Disability (NCPAD) play a pivotal role in disseminating research findings to practitioners about physical education. NCPAD, in particular, publishes a monthly electronic newsletter and it includes substantially useful information, such as nutrition and physical activity tips, prevention of secondary conditions, video exercise instructions, book reviews, and emerging evidence (health and physical activity related) for individuals with
disabilities. The website also has a research pool in which research findings have been accumulated, and practitioners can easily find what they need in practice.

Other than APE related organizations, there are a couple of organizations that will not only help practitioners to understand the concept of EBP, but also provide research findings in educational settings. Cutspec (2004) described four centers (the Campbell Collaboration, Evidence-Based Education UK, the Center for Evidence-Based Education, and the Research and Training Center for Evidence-Based Education) to bridge the research-to-practice gap in education. All four centers not only have user-friendly designed educational information from evidence-based research, but also provide useful reviews and summaries of experimental research in education to help teachers easily implement the evidence in their classes. In addition, the What Works Clearinghouse (http://ies.ed.gov/ncee/wwc/), administered by the U.S. Department of Education, is a source of scientific evidence of what works in education by intervention reports in a format that practitioners can easily understand on specific topics, such as beginning reading, elementary school math, and character education.

Training practitioners is an important part as well as the dissemination of evidence. National or State professional conferences can make special training sessions in series to educate APE practitioners with topics such as ‘How to Improve Critical Thinking Skills’, ‘How to Make Best Decisions’, and ‘How to Initiate EBP’. Local workshops also can play a key role in training practitioners to implement EBP. Researchers or college professors can make presentations regarding how to easily understand research findings including some jargon and how to appropriately apply
them in their classes. This workshop would be a great opportunity for teachers to make connections for communication with each other. These continuous supports from third-parties and the ongoing endeavor for educating practitioners give those in APE with a wide window of opportunities to implement EBP.

Strategies for implementing evidence. It is important to understand how decisions are made from an evidence-based perspective (Buysse et al., 2006). Table A1.1 illustrates an outline of the necessary steps, including the process of gathering information related to EBP in education.

<table>
<thead>
<tr>
<th>Table A.1 The steps of evidence-based practice in education</th>
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<tr>
<td><strong>Steps</strong></td>
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<td>---------------------------------</td>
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<tr>
<td>Step 1 Identify a problem and Convert the problem into a specific question</td>
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<tr>
<td>Step 2 Search for evidence related to the question and Critically appraise the pertinent evidence</td>
</tr>
<tr>
<td>Step 3 Integrate the evidence with the teachers’ expertise and the school circumstances to make a decision about appropriate instruction</td>
</tr>
<tr>
<td>Step 4 Implement instruction</td>
</tr>
<tr>
<td>Step 5 Reevaluate the outcome and Record the reevaluated data</td>
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For example, Tom, an APE teacher, has John, a 10-year-old student with Downs Syndrome who has inadequate physical fitness in his class. Tom wants to develop John’s physical fitness through a physical education class. In this case, the first step is to identify a problem and ask specific questions. The problems would be inadequate physical fitness and many specific questions, such as the proper tool to measure physical fitness level, frequency of classes to increase physical fitness and appropriate program for instruction, could be developed depending on the teacher’s thoughts. Tom
converts John’s problem into an appropriate program for instruction in a specific manner. Tom searches for a suitable evidence-related program for John to increase his physical fitness as the second step. There would be five choices for gathering evidence: reading articles, asking experts, searching the internet, attending professional conferences, and/or attending local workshops. Tom decides to find evidence from reading articles regarding his question. Tom critically appraises the evidence to check if the evidence can be pertinently applied to John’s case based upon his characteristics and educational needs. John’s individualized education program (IEP) could play a useful role in appraising and deciding the appropriateness of the evidence. Tom determines it is appropriate for him and integrates his expertise (educational experience and content knowledge) and school situations (facilities and supports from administrators) with the appraised evidence. According to various school environments and teacher’s expertise, the evidence that Tom found may result in different outcomes.

Tom successfully implemented the evidence-based teaching in his class, and John made improvements in his physical fitness over 6 months. However, the most important step, which is step 5, is remaining. Tom needs to reevaluate the outcome to make a judgment to increase the worth of the EBP. In order to accumulate working evidence, Tom has to record the reliable outcome, so Tom uses the accumulated evidence for other students with a similar problem. When the data are continuously accumulated with a variety of variables, such as teacher’s expertise, school environments, and student’s characteristics, the practice-based evidence is created and a meaningful hierarchy of evidence eventually would be established.
Conclusion

A majority of people in APE may think EBP is difficult to realize in actual practice due to a number of reasons, and the reasons may be derived from two major aspects. One would be a lack of in-depth understanding of what EBP means. The other one would be the practitioners’ stereotypic recognition that a gap between evidence and practice always exists. This gap could be explained by diverse factors, but the biggest causal factor would be difficulties of evidence- or research-based data (e.g. technical terminologies and complicated statistical analyses) that make evidence difficult to understand, ineffectively disseminated, and not well applied in practice by practitioners.

It is hoped that this paper will help APE practitioners correctly understand the concept and meaning of EBP, which can overcome the first challenge. However, to overcome the stereotypic recognition in terms of the gap, ongoing efforts of researchers and professionals in higher education are needed. Particularly, a review paper, including efficacious evidence reorganized by similar topics in specific populations according to type and level of disabilities would be recommended in order to help APE practitioners more easily understand and apply the evidence, as well as saving time searching for evidence, which is one of the big challenges in practice. A synthesis of research findings and assistance in resolving conflicting research evidence through meta-analyses on specific research topics are also suggested (Huang et al., 2003). Finally, establishing standards of evidence (e.g. Flay et al., 2005), including a set of criteria, could assist APE practitioners in easily evaluating the effectiveness of evidence and it would be a short cut to promote dissemination of evidence. Further
research is needed to establish the standards and justify them for a wide spread or evidence.
References


APPENDIX B: REVIEW PAPER 2

Changing Teaching Behavior to Include Students with Disabilities in Inclusive Contexts: Application of Transtheoretical Model in PETE

Jooyeon Jin
Abstract

Including students with disabilities in physical education is a current phenomena and it provides substantial benefits to all students. However, not all general physical educators fully support including children with disabilities in their classes. These negative intentions and beliefs should be changed while physical educators are in physical education teacher education (PETE) programs. One successful theoretical framework that has been used in many other fields is called the Transtheoretical Model (TTM). The TTM is a powerful tool to change people’s beliefs and intentions. The purpose of this paper is to introduce the primary concept and key components of the TTM within the context of PETE programs, especially for PETE faculty.
Including students with disabilities in general education classes is now standard education policy in school districts across the United States (McCay & Keyes, 2001). Two main pieces of federal law, the Individuals with Disabilities Education Act (IDEA) and Section 504 of the Rehabilitation Act of 1973, have supported the importance of inclusion in educational settings. Particularly, the IDEA created a detailed set of guidelines to ensure an appropriate education in the least restrictive environment for students who are eligible for special education programs (Yell & Katsiyannis, 2004). According to Gartin and Murdick (2005), “the focus of IDEA has been, and continues to be, the inclusion of students with their non-disabled peers whenever and wherever possible” (p. 328). Inclusive physical education settings not only offer an opportunity for learning about how everyone can become physically active through a variety of movement and fitness activities (Webb & Pope, 1999), but also provide all students with a variety of benefits, such as more opportunities for motivation and participation, potential for new friendships, and appreciating individual differences and less prejudice (Block, 2007). However, general physical education teachers may not be fully supportive of including children with disabilities in physical education (Duchane & French, 1998; Linert, Sherrill, & Myers, 2001). These negative intentions should be changed and research needs to focus more on how to change them for successful inclusion so that the teacher’s intention directly affects teaching behavior.

To change the negative factors toward inclusion, there might be a variety of strategies, such as informational, behavioral, and environmental approaches through a national campaign, professional conferences, local workshops, and consultation with
experts. Among these approaches, the best potential strategy could be through a Physical Education Teacher Education (PETE) training period, which is an important stage for cognitive and behavioral development of a pre-service teacher. In this stage, the pre-service teacher constructs his/her own teaching philosophy (e.g. how to perceive students with disabilities) and this learning process significantly affects formulating and building the root of future teaching behavior. PETE programs train pre-service teachers to learn new knowledge and skills (e.g. problem solving, effective instruction, and behavior management skills) by providing systematic course work and practical experiences. In fact, a majority of adapted physical education classes taught in higher education have tried to improve the negative intentions and/or behavior of future teachers. However, few studies have actually examined the effects of the behavior change process, and most efforts were given to change intentions and/or behavior via building positive attitudes.

Efforts for changing teacher’s attitudes are important. The primary goal of attitude studies is to predict and change behavior. Understanding attitudes gives us an idea about how the behavior change mechanism works. A number of studies in Adapted Physical Education (APE) have assumed the possibilities of behavior change by observational and experimental research findings on attitudes. Many studies examined teacher’s attitude change based on a theoretical framework named the Theory of Planned Behavior (TPB), which was expanded from the Theory of Reasoned Action (TRA). A sound theoretical foundation of attitude studies helps educational practice, such as inclusive physical education, to be explained and controlled (Kozub & Lienert, 2003). However, the importance of attitude has been overemphasized as a
main determinant for predicting teaching behavior, and there is a lack of the direct link in APE studies, as well as in physical activity research. The direct mediating factor of behavior is one’s intention influenced by attitude, subjective norm, and perceived behavioral control (Ajzen, 2001). The focus should be beyond attitude changes and effort should be given to a change of intention and/or behavior.

According to Xiao, O’Neill, Prochaska, Kerbel, Brennan, and Bristow (2004), the Transtheoretical Model (TTM) has been successfully used in dozens of empirical studies to predict intentions and change behavior. A substantial number of studies have shown evidence about the effectiveness of the TTM to change behavior in a range of practical contexts. In health-related areas, for example, the TTM is employed to change health-related behaviors, such as sexual risk (Smith, & DiClemente, 2000), obesity (Baranowski, Cullen, Nicklas, Thompson, & Baranowski, 2003), dietary change (Kristal, Glanz, Curry, & Patterson, 1999; Kasila, Poskiparta, Karhila, & Kettunen, 2003), exercise promotion (Wright, Patterson, & Cardinal, 2000), exercise adherence (Fallon et al., 2005; Guillot, Kilpatrick, Hebert & Hollander, 2004), and regular exercise (O’Connor, 1994). The most valuable characteristic of the TTM is that it predicts the current stage for change and provides stage-matched strategies for change. Although the TTM has not been widely used in educational settings, it has a great potential to change negative intentions and/or behavior in regards to teaching students with disabilities. The purpose of this paper is to discuss central concepts of the TTM to help effectively change the negative teaching behavior of pre-service teachers toward successful inclusion of students with disabilities in physical education.
This paper is divided into three sections. The first section describes why PETE is an important period to establish positive teaching behavior regarding inclusion. Key concepts are then provided to understand what the TTM is. The third section introduces four components of the TTM and how they can be applied in PETE contexts along with realistic examples for practical application. With the application of the TTM, it is hoped that the PETE program will shed light on the way in which all students can get more benefits from inclusion.

**PETE period to formulate positive teaching behavior toward inclusion**

Positive intentions toward heterogeneous groups of learners in regular classes can lead to effective teaching behavior, and this intention can not only strengthen/weaken students’ achievements, but also be a potent variable for successfully including students with disabilities in physical education (Duchane & French, 1998). According to Ajzen (2001), people behave with their intentions and perceptions of control over behavior. In the same vein, physical educators behave with their intentions influenced by wide variations in pre- and in-service trainings, school environments, and district resources, as well as administrative leadership. Particularly, pre-service and in-service trainings play a significant role in formulating and changing the teaching behavior of general physical educators toward inclusion.

According to Block and Obrusnikova (2007), general physical education teachers’ negative feelings toward inclusion are often determined by inadequate training and from lack of the experience and knowledge to successfully include students with disabilities. Lienert et al. (2001) found that many physical education
teachers believed they were not sufficiently trained to teach students with disabilities in integrated settings. However, pre-service training would be more effective than in-service training. To be specific, in-service physical educators might be less motivated because they are not required to take additional in-service training to effectively accommodate students with disabilities even though they feel incompetent for inclusion. Furthermore, there is a lack of opportunities for in-service trainings related to physical education in comparison with other subjects, such as reading, math, and science. Some in-service teachers feel they don’t have enough time for additional trainings.

In contrast, pre-service teachers are highly motivated. The PETE program continuously provides a variety of pre-service trainings, which are required, and consistently stimulate teachers to be literate and enthusiastic in-service physical educators. Particularly, teacher education periods integrating coursework, teaching internships, and state certification requirements would be the most significant time to formulate the behaviors over intentions influencing student learning outcomes (Bogard, Traylor, & Takanishi, 2008). Thus, for successful inclusion, pre-service training in PETE would be an easier way to formulate positive intention and change teaching behavior than changing teaching behavior through in-service training.

PETE faculty could design individual pre-service programs like coursework (e.g. taking more adapted physical education classes) and student teaching internships (e.g. increasing interaction time with students with disabilities in teaching practicum) by assessing readiness of a pre-service teacher using the TTM.
Key concepts of TTM

The TTM is a conceptual framework to predict the current stage of readiness regarding specific behavior and guide appropriate strategies to change intentions and behavior. The TTM is a powerful motivation tool and used for both behavioral and emotional changes, particularly for decreasing negative factors and increasing positive factors. For example, the TTM can be used to change specific teaching behaviors of physical educators, such as increasing infrequent use of positive behavior feedback and decreasing frequent use of verbal desists. According to Prochaska, Norcross, and Declemente (1994), few of the changes people experience are under their control, and some behaviors, thoughts, and feelings could be changed by how much they are motivated. Behavioral science researchers recognize that behavior was too complex to systematically and consistently respond to only one intervention, and consequently they incorporated all of the principal theories of traditional psychotherapy (Samuelson, 1998). This procedure was the origin of the theory we are calling the TTM, which is used to understand how individuals change behaviors.

The TTM has been used in a variety of contexts, including healthy life style, regular exercising, obesity prevention, stress management, and conceptualizing and assessing emotional readiness. However, the TTM has not been applied to the physical education profession to improve educational outcomes by changing educators’ teaching behavior. The TTM would provide researchers with a new theory-based framework to predict teacher’s intentions and change teaching behavior. In particular, it would encourage research on current stages of future physical education teachers’ readiness for inclusion, so that stage-matched strategies can be guided to plan
appropriate pre-service programs for future teachers toward inclusion of students with disabilities.

The TTM suggests that people do not change all at once, but instead move through a series of stages representing their level of readiness to change, which can be understood as people’s current thoughts, feelings and internal conditions as influenced by external factors (Ciccomascolo & Riebe, 2006; Miller & Rollnick, 1991). The TTM systematically integrates four components to change: (a) stage of change, (b) decisional balance, (c) self-efficacy, and (d) processes of change. The following paragraphs will introduce unique features of each component with specific examples for their practical application into PETE.

**Major components of TTM**

**Stages of change.** Stages of change refer to a person’s readiness to change and consist of pre-contemplation, contemplation, preparation, action, and maintenance (Spencer et al., 2006). Each stage includes a period of time and a set of tasks needed for movement to the next stages (Prochaska & Norcross, 2001). Precontemplation is the stage in which people have no intention to take action in the foreseeable future (within the next six months). For example, some physical educators in pre-service training are not interested in inclusion and resist change to include students with disabilities in inclusion classes. Precontemplators are often uninformed or underinformed about the importance of specific actions (Prochaska, Mauriello, Sherman, Harlow, Silver, & Trubatch, 2006), such as the importance of developing knowledge and experiences regarding inclusion of students with disabilities.
Contemplation is the stage in which people are more likely to recognize taking action, and they have intent to change in the near future (within the next six months). Pre-service teachers in contemplation begin to think seriously about inclusion of students with disabilities, but they have not yet learned how to include children with disabilities. They may think it is good to include children with disabilities in physical education classes, but they are not putting in efforts to learn how to do it. Namely, they are not ready to implement it in their classroom in the near future. People in the contemplation stage are seriously thinking about the change, but they are still not taking actions to change.

Preparation is the stage in which people are intending and ready to take action to change, so they are starting to make small changes, and are planning to start regularly taking actions in the next month. Action is the stage in which people are actively engaging in taking action to decrease negative behavior or increase positive behavior for less than six months. Pre-service teachers in the action stage are required to commit their time and energy for a considerable change of behavior toward inclusion. Maintenance is the stage in which people are sustaining a new behavior. For instance, if a future physical education teacher is taking action more than 6 months (e.g. taking additional adapted physical education classes, working at APE class as an assistant teacher, and attending after school physical activity programs for students with disabilities as a volunteer), he/she becomes more confident that he/she can continue to have positive intentions to teach students with disabilities in inclusive contexts.
One appealing aspect of this construct of the TTM is that it encompasses behavior and behavioral intentions (Marcus & Simkin, 1994), so it can help PETE faculty to gain a better understanding of their students (Wright et al., 2000). For instance, if the faculty can recognize that a student (pre-service teacher) is in a particular stage, they can attempt to change the student’s thinking by implementing a well-designed individualized program of study using stage-matched intervention. Table B.1 shows specific descriptions of each stage, predicting current readiness of future physical education teachers toward inclusion of students with disabilities.

**Table B.1 Stages of change of physical education teachers**

<table>
<thead>
<tr>
<th>Stages of Change</th>
<th>Descriptions</th>
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<tbody>
<tr>
<td>Precontemplation stage</td>
<td>I am not intending to develop my knowledge and experiences regarding inclusion of students with disabilities in the next six months</td>
</tr>
<tr>
<td>Contemplation stage</td>
<td>I am intending to develop my knowledge and experiences regarding inclusion of students with disabilities in the next six months</td>
</tr>
<tr>
<td>Preparation stage</td>
<td>I am intending to develop my knowledge and experiences regarding inclusion of students with disabilities in the next 30 days</td>
</tr>
<tr>
<td>Action stage</td>
<td>I am currently developing my knowledge and experiences regarding inclusion of students with disabilities for less than six months</td>
</tr>
<tr>
<td>Maintenance stage</td>
<td>I am currently developing my knowledge and experiences regarding inclusion of students with disabilities for more than six months</td>
</tr>
</tbody>
</table>

*Decisional balance.* Decisional balance was originally derived from the decision-making theory of Janis and Mann (1977), and adapted to one of the constructs in the TTM. It refers to the process of weighing the gains (pros) against the losses (cons) of behavioral change (Marcus, Eaton, Rossi, & Harlow, 1994), and looks at positive and negative aspects for change. For instance, PETE faculty can use the decisional balance measure to see a pre-service teacher’s pros and cons of continuing a current behavior (negative teaching behavior toward inclusion) or adopting a new behavior (positive teaching behavior toward inclusion). As the pros increase and the
cons decrease, an individual moves forward from contemplation into preparation and action (Spencer et al., 2006).

According to Prochaska et al. (2005), the balance of pros and cons is systematically associated with stage of change in all behaviors that they examined (e.g., smoking cessation, HIV risk reduction, diet, and exercise). For example, a pre-service teacher wants to learn how to modify a lesson plan to effectively accommodate students with disabilities in a physical education class. He/She understand that instructional modification strategies are important and have to be mastered before graduating from the PETE program because it will help in future teaching. At the same time, however, he/she fully recognizes that it will be time consuming work to add up modification strategies in each lesson, and decides that it may not be worthwhile to try in a limited time frame. The cons of decisional balance outweigh the pros in the precontemplation, the pros and cons are similar in the middle stages like the example above, and the pros outweigh the cons in the action stage, so the degree of change in pros and cons needs to progress across the stages of change (Prochaska et al., 2006).

Increasing aspects of pros and decreasing aspects of cons in decision making could help pre-service physical education teachers to increase intentions to take the steps for developing knowledge and experiences for including students with disabilities in pre-service programs. For example, faculty in PETE can use decisional balance as a predictor to identify how pre-service physical education teachers are thinking about the inclusion of students with disabilities in regard to pros and cons. The result of the decisional balance could be used to understand not only the current thoughts of pre-service teachers, but also how well they are ready for teaching
students with disabilities based on their pros and cons. If a pre-service physical
education teacher shows that inclusion has more disadvantages (cons) than advantages
(pros) in a physical education setting, pre-service programs should strengthen the
positive aspects of including students with disabilities (e.g. increase practicum time to
understanding benefits of inclusion based physical education by working with an
excellent physical education teacher who has great strategies regarding the inclusion
class).

Self efficacy. Self-efficacy is the degree of confidence a person has to change
(Marcus et al., 1994), and can influence motivation and persistence (Bandura, 1977). It
is conceptualized as the degree of anticipated difficulty in performing behavior
choice, effort expenditure, thoughts, emotional reactions, and behavioral performance”
(p. 1401). Self-efficacy increases in a linear manner with advancing stages. That is,
those in the precontemplation stage show lower self-efficacy than those in the
contemplation, and increase in the preparation and action stage, and then increase
again in the maintenance stage. In the situation this paper is suggesting, self-efficacy
for inclusion of students with disabilities would mean having the confidence to take
the steps of teaching and managing students with a range of types and levels of
disabilities in a variety of difficult inclusive environments (e.g. when a teacher has a
student with severe disabilities). According to Prochaska et al. (2005), an individual
could be encouraged to set realistic goals for moving to the next stage, one at a time,
to increase self-efficacy. For example, PETE faculty could encourage a pre-service
teacher, who has low-levels of self-efficacy, to take one of the adapted physical
education classes designed to offer instructional (e.g. grouping and peer tutoring) and curricular (e.g. developmental and ecological analysis) modification strategies for inclusion with all students with and without disabilities. Consistent observations of well-designed inclusive physical education classes would be another way for the pre-service teacher to increase his/her confidence in difficult inclusive teaching situations.

*Processes of change.* The processes of change are covert or overt strategies that individuals use to modify their experiences and/or environments to change their target behavior (Marcus & Simkin, 1994). The strategies include 10 processes that a person can use to move upward, and are made up of five cognitive processes (consciousness raising, dramatic relief, environmental reevaluation, self-reevaluation, and social liberation) and five behavioral processes (counter-conditioning, helping relationships, reinforcement management, self-liberation, and stimulus control) (Marcus, Rossi, Selby, Niaura, & Abrams, 1992). The processes of change, theoretically, are derived from hundreds of theories of psychotherapy, and are summarized in 10 essential principles. Table B.2 defines the processes of change to improve intentions and teaching behaviors of pre-service physical education teachers for inclusion of students with disabilities. The cognitive processes tend to be emphasized for people in the earlier stages (precontemplation and contemplation) of change and the behavioral processes tend to be emphasized for people in the later stages (action and maintenance).
Table B.2 Definition of ten processes to change teaching behavior and behavioral intentions for inclusion of students with disabilities

<table>
<thead>
<tr>
<th>Process of Change</th>
<th>Definition</th>
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<tr>
<td><strong>Cognitive</strong></td>
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<tr>
<td>Consciousness Raising</td>
<td>Increasing awareness via information, education, and personal feedback that can positively and effectively teach students with disabilities in inclusive based physical education.</td>
</tr>
<tr>
<td>Dramatic Relief</td>
<td>Experiencing strong motivations about successes in teaching students with disabilities in inclusion based physical education.</td>
</tr>
<tr>
<td>Environmental Reevaluation</td>
<td>Realizing the positive impact of teaching students with disabilities in inclusion based physical education classes on colleagues around you and your school environment.</td>
</tr>
<tr>
<td>Self-Reevaluation</td>
<td>Realizing that teaching students with disabilities in inclusive physical education is an important part of improving educational outcomes.</td>
</tr>
<tr>
<td>Social Liberation</td>
<td>Realizing that the social norms are changing in the direction of supporting the value of inclusion based physical education.</td>
</tr>
<tr>
<td><strong>Behavioral</strong></td>
<td></td>
</tr>
<tr>
<td>Counter-Conditioning</td>
<td>Substituting educational alternatives for negative intentions associated with teaching students with disabilities in inclusion based physical education.</td>
</tr>
<tr>
<td>Helping Relationships</td>
<td>Seeking and using social support to value inclusion based physical education</td>
</tr>
<tr>
<td>Reinforcement Management</td>
<td>Increasing the rewards to value inclusion of students with disabilities in physical education.</td>
</tr>
<tr>
<td>Self-Liberation</td>
<td>Making a firm commitment to teach students with disabilities in inclusion based physical education.</td>
</tr>
<tr>
<td>Stimulus Control</td>
<td>Removing cues and avoiding situations that devalue inclusion based physical education.</td>
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</tbody>
</table>


Processes of change are specifically related to each stage, and Table B.3 depicts stages of change in which particular change processes are most useful. A number of researchers using the TTM have demonstrated that different processes of
change are linked to different stages of change. Thus, the key concept to promote successful change is to understand what stage a person is in, and decide what strategies (processes of change) he/she could use to move forward (Xiao et al., 2004). Namely, helping relationships and reinforcement management would be helpful for those in the action and maintenance stages, but not in the precontemplation and contemplation stages. People in preparation stages would need strategies of self-reevaluation and self-liberation to progress forward, but not the precontemplation and maintenance stages. For example, once PETE faculty assessed the current stage of a pre-service teacher toward inclusion of students with disabilities, the faculty could determine the most appropriate intervention strategies and implement them to help the pre-service teacher progress to the next stage of change.

| Table B.3 Stages of change in which particular change processes are most useful |
|---------------------------------|-------------------------------|-----------------|-----------------|-----------------|-----------------|
| Precontemplation                | Contemplation                 | Preparation     | Action           | Maintenance     |
|                                 | Consciousness-Raising         |                 |                 |                 |                 |
|                                 | Dramatic Relief               |                 |                 |                 |                 |
|                                 | Environmental Reevaluation    |                 |                 |                 |                 |
|                                 | Social Liberation             |                 |                 |                 |                 |
|                                 | Self-Reevaluation              |                 |                 |                 |                 |
|                                 | Self-Liberation                |                 |                 |                 |                 |
|                                 |                               |                 |                 | Counter conditioning |
|                                 |                               |                 |                 | Reinforcement management |
|                                 |                               |                 |                 | Helping Relationships |
|                                 |                               |                 |                 | Stimulus Control |


Conclusion

The TpB and the TTM seem to be completely different theories using different determinants of behavior and behavior change, but they have conceptually similar
variables. First, both theories are emphasizing intentions as the best predictor of behavior. Second, according to Jordan, Nigg, Norman, Rossi, and Benisovich (2002), each theory places great importance on decision making because pros and cons from the TTM mirror the behavior beliefs from the TPB consisting of the basis of attitudes toward behavior. Jordan et al. stated that attitudes in the TPB focus on an individual’s positive or negative evaluation of a specific behavior. Furthermore, according to Ajzen (2001), perceived behavior control, which is one of the determinants influencing intention, is comprised of perceived controllability of performing a behavior and self-efficacy (perceived difficulty of performing a behavior), and self-efficacy may be a more important antecedent of intentions and actions. This self-efficacy construct would be the third similarity of both theories.

Both the TPB and the TTM are widely used theories. Each theory has solid theoretical and empirical evidence with unique constructs for behavior change, and numerous studies have been conducted using the two theoretical frameworks. However, there is no doubt that both may need more predictors to contribute to behavior change in practice, especially in educational settings: inclusion based physical education (Ajzen, 2001; Kozub & Lienert, 2003). The study of Jordan et al. (2002) supports the effectiveness of this combination. They revealed that cognitive and affective attitudes of TPB are strongly related to the decisional balance of the TTM, and suggested that attitudes may strengthen the decision making aspect of the TTM. In their study, in particular, attitudes increased with each stage, that is to say, lowest in the precontemplation stage and highest in the maintenance stage, in a linear fashion like other aspects of the TTM, such as self-efficacy and decisional balance.
There are many variables that affect teaching behavior for inclusion of students with disabilities, including pre-service preparation, school organization, in-service training opportunities, district resources, and administrative leadership. Many researchers in APE have attempted to improve teaching behavior using attitude change toward inclusion based physical education, but research findings using the TPB have been inconsistent and have not yet found a solid relationship between attitude and behavior. As a result, this paper suggests the TTM as a new theoretical framework to change behavioral intentions and behavior toward inclusion. The author firmly believes that the TTM could be the best possible strategy to change teaching behavior for including students with disabilities and that PETE programs will contribute to the change on this theoretical foundation.
References


APPENDIX C: INVITATION LETTER FOR MAIL BASED SURVEY

Dear Colleague

You are invited to take part in this study designed to develop a measurement system for change of teaching behavior and intention to implement Evidence-based Education (EBE) for students with disabilities in physical education classes. This study will help us develop a validated measurement system in order to understand physical educators' current stages to use EBE. We believe that it is important to identify the teachers' readiness and current stage to use EBE, prior to simplifying the importance of EBE.

We would appreciate it if you would take about 20-25 minutes to respond to the enclosed questionnaire and return it in the envelope provided. Your identity will not be made public if the results of this project are published. Your participation in this study is voluntary and you may refuse to answer any question(s) for any reason. Only researchers at Oregon State University related to this study will have access to the information you provide, which will be kept confidential to the extent permitted by law.

We hope that in the future, students with disabilities might benefit from this study because the knowledge that will be gained will be used to improve teacher's behavior related to physical education to satisfy the special needs of students with disabilities. There will be no risk associated with this study. You will not be paid for your participation, but if you complete the survey you will be included in a raffle. A winner from the raffle will be notified via email or mail, and be given a $100 gift card via mail.

If you decide to take part in the study, it should be because you really want to volunteer. You will not lose any benefits or rights you would normally have if you choose not to volunteer. You can stop at any time during the study and still keep the benefits and rights you had before volunteering. You are free to skip any questions that you prefer not to answer. If you choose to withdraw from the project before it ends, the researchers may keep information collected about you and this information may be included in study reports.

If you have any questions about this research project, please contact: Joonkoo Yun, 541-737-8584 or jk.yun@oregonstate.edu or contact Jooyeon Jin, 541-737-5927 or jinj@onid.orst.edu.
If you have questions about your rights as a participant, please contact the Oregon State University Institutional Review Board (IRB) Human Protection Administrator, at (541) 737-4933 or by email at IRB@oregonstate.edu.

Thank you for your help. We appreciate your cooperation.

Sincerely,

Jooyeon Jin

Joonkoo Yun, Ph.D.

Revised: 03-05
APPENDIX D: INVITATION LETTER FOR INTERNET BASED SURVEY

"Give me your two cents’ worth"

Dear Colleague

You are invited to take part in this study designed to develop a measurement system for change of teaching behavior and intention to implement Evidence-based Education (EBE) for students with disabilities in physical education classes. This study will help us develop a validated measurement system in order to understand teacher’s current stages to use EBE. We believe that it is important to identify the teachers’ readiness and current stage to implement EBE, prior to simply emphasizing the importance of EBE.

We would appreciate it if you would take about 20-25 minutes to respond to the online questionnaire. You will not be paid for your participation, but if you complete the survey you will be included in a random raffle. A winner from the raffle will be notified via email or mail, and be given a $100 gift card via mail.

You can access the survey, at

http://www.surveymonkey.com/s.aspx?sm=WFX60h_2FhXKdHSpOeQo20Q3d_3d

Due to the long wording of web address, you may challenge to access the survey using the address provided above. To help to easily link the survey, approximately one week later email invitation letter including web address (the same as the address above) will be given to you. If you can email me (jinj@onid.orst.edu) your primary email address to make sure, it would be great.

Please check the email named by “Survey for Evidence-based Physical Education.”

If you have any questions about this research project, please contact: Joonkoo Yun, 541-737-8584 or jk.yun@oregonstate.edu or contact Jooyeon Jin, 541-737-5927 or jinj@onid.orst.edu.

If you have questions about your rights as a participant, please contact the Oregon State University Institutional Review Board (IRB) Human Protections Administrator, at (541) 737-4933 or by email at IRB@oregonstate.edu.

Thank you in advance for your help. We highly appreciate your cooperation.

Sincerely,

Jooyeon Jin

Joonkoo Yun, Ph.D.

Revised: 05-05
APPENDIX E: INSTITUTIONAL REVIEW BOARD APPROVAL

OSU
Oregon State University
Institutional Review Board + Office of Sponsored Programs and Research Compliance
Oregon State University, 312 Karr Administration Building, Corvallis, Oregon 97331-2140
Tel 541-737-4933 | Fax 541-737-9693 | http://oregonstate.edu/research/irb/humansubjects.htm
IRB@oregonstate.edu

TO: Joonkoo Yun
Nutrition and Exercise Science

IRB #: 3929 – Development of a Measurement System for Evidence-Based Adapted Physical
Education Based on Transtheoretical Model (Student Researcher: Jooyeon Jin)

Level of Review: Exempt
Expiration Date: 4-16-09
Approved Number of Participants: 1,400

The referenced project was reviewed under the guidelines of Oregon State University's Institutional
Review Board (IRB). The IRB has approved the:

(X) Initial Application ( ) Continuing Review ( ) Project Revision
with a (if applicable): (X) Waiver of documentation of Informed Consent ( ) Waiver of Consent

A copy of this information will be provided to the full IRB committee.

- CONSENT FORM: All participants must receive the IRB-stamped informed consent document. If
  the consent is in a format that could not have stamp placement (i.e. web site language, email
  language, etc.), then the language must be exactly as the IRB approved it.
- PROJECT REVISION REQUEST: Any changes to the approved protocol (e.g. protocol,
  informed consent form(s), testing instrument(s), research staff, recruitment material, or increase in
  the number of participants) must be submitted for approval before implementation.
- ADVERSE EVENTS: Must be reported within three days of occurrence. This includes any
  outcome that is not expected, routine and that result in bodily injury and/or psychological,
  emotional, or physical harm or stress.
- CONTINUING REVIEW: A courtesy notice will be sent to remind researchers to complete the
  continuing review form to renew this project, however – it is the researcher’s responsibility to ensure
  that continuing review occurs prior to the expiration date. Material must be submitted with adequate
  time for the office to process paperwork. If there is a lapse in approval, suspension of all activity
  including data analysis, will occur.
- DEVIATION/EXCEPTIONS: Any departure from the approved protocol must be reported within
  10 business days of occurrence or when discovered.

Forms are available at: http://oregonstate.edu/research/irb/humansubjects.htm.

If you have any questions, please contact the IRB Human Protections Administrator at
IRB@oregonstate.edu or by phone at (541) 737-8008.

Elisa Espinoza Falls
IRB Human Protections Administrator

Date: 4-17-08
Assessment of Readiness for Implementing Evidence-based Physical Education for Students with Disabilities

Two main pieces of federal legislation, the Individuals with Disability Education Act (IDEA) and the No Child Left Behind Act (NCLB), are currently calling for education professionals to implement academic and behavioral intervention based on quality evidence. Evidence-based Education plays a pivotal role in gaining confidence in decision making, minimizing the waste of time and money, and effectively solving a variety of problems that may arise in physical education. This survey evaluates the teacher’s readiness for implementing Evidence-based Education in physical education classes. Evidence-based Education is defined as the best practice of integrating individual teaching strategies with the best available evidence from internet, articles, experts, professional conferences, and/or in-service training.

General Directions: This survey consists of six sections and contains a series of statements related to Evidence-based Education. There are no right or wrong responses. Simply mark the responses that best illustrate your experience. Specific directions on each section will help you to make decisions.

Please seal the completed survey in the enclosed envelope and return it to Women’s Building 123, Oregon State University WITHIN ONE WEEK. Your responses on this survey will be anonymous. THANK YOU VERY MUCH for your help!

Section 1: Background Information

Directions: This section is for gathering information about your background and school environment. Please clearly mark your responses.

1. What is your gender?
   □ Male
   □ Female

2. How old are you?

3. Number of years teaching physical education

4. What is your highest degree?
   □ Bachelor’s Degree
   □ Master’s Degree
   □ Doctoral Degree
   □ Other

5. Year received highest degree

6. What kind of teaching certifications do you have? (mark all that apply)
   □ General Physical Education
   □ Classroom teacher
   □ State endorsement in Adapted Physical Education or Certified APE
   □ Health Teacher
   □ Special education teacher

6-A. What is your primary responsibility in your school? (mark all that apply)
   □ Classroom teacher
   □ Physical education teacher
   □ APE teacher
   □ Special education teacher
   □ Other

7. You are currently teaching (mark all that apply)
   □ Elementary school
   □ Middle school
   □ General physical education
   □ Adapted physical education
   □ High school

8. What is the Zip code of your school?

9. Does your school have segregated physical education classes for students with disabilities?
   □ Yes
   □ No

10. Are students with disabilities included in regular physical education class at your school?
    □ Yes
    □ No

11. Do you have students with disabilities (e.g. learning disability, autism, physical disability, etc.) in your classroom?
    □ Yes
    □ No
    □ I don’t know

12. Do you have an Individualized Education Program (IEP) for your students with disabilities?
    □ Yes
    □ No
    □ I don’t know

13. How many minutes per week do you teach your students physical education?
    □ 30 - 60
    □ 70 - 120
    □ 130 - 180
    □ 190 - 240
    □ Other
APPENDIX F: MAIL BASED INSTRUMENT (Continued: page 2)

Section 2: Stages for Evidence-based Education

Directions: In this survey, Evidence-based Education (EBE) is defined as the best practice of integrating individual teaching strategies with the best available evidence from internet, articles, experts, professional conferences, and/or in-service training. This section attempts to classify you into a stage of change regarding implementation of EBE. Please carefully read the following questions, and mark either yes or no as appropriate.

Q1) How do you find answers to questions or solve problems related to teaching PE? (Mark All that apply)
- 1. Using Own Expertise
- 2. Using Own Experience
- 4. Searching Internet
- 5. Reading Articles
- 6. In-Service Training

If you marked 3, 4, 5, and/or 6, GO TO Q2; Otherwise, GO TO Q3

Q2) Have you regularly used external information, such as articles, experts, in-service training, or the internet to improve teaching PE?
- Yes → Go to Question 4
- No → Go to Question 5

Q3) Have you thought about using external information, such as articles, experts, in-service training, or the internet along with your expertise and experience to improve teaching PE?
- Yes → Go to Question 5
- No → Go to Section 3

Q4) Have you been regularly using external information, such as articles, experts, in-service training, or the internet with your expertise and experience to improve teaching PE for at least the past six months?
- Yes → Go to Section 4
- No → Go to Section 4

Q5) Do you intend to use external information, such as articles, experts, in-service training, or the internet within the next month to improve teaching PE?
- Yes → Go to Section 4
- No → Go to Section 3

Section 3: Stages for readiness to implement Evidence-based Education

Directions: This section is to understand your readiness to implement Evidence-based Education (EBE). Please mark the ONE STATEMENT of the five alternatives, that best describes your readiness to implement EBE in your physical education classes for students with disabilities.

Emotional readiness to implement EBE is defined as satisfying Each of the Three Following Criteria:

1) I accept that EBE is a framework for better physical education for students with disabilities.
2) I understand what EBE means.
3) When I have questions (problems) related to teaching physical education, I am willing to use external information, such as articles, experts, in-service training, or the internet to answer the questions.

- I am not intending to meet the three criteria to be emotionally ready to implement EBE in the next six months.
- I am intending to meet the three criteria to be emotionally ready to implement EBE in the next six months.
- I am intending to meet the three criteria to be emotionally ready to implement EBE in the next 30 days.
- I have met the three criteria but less than six months ago.
- I have met the three criteria for more than six months.
APPENDIX F: MAIL BASED INSTRUMENT (Continued: page 3)

Section 4: Self-Efficacy

Directions: Listed below are 14 statements designed to assess your beliefs in your ability to use Evidence-based Education under various circumstances or conditions. Please rate each statement as it applies to you and your situation. Please mark only one choice per statement.

The following phrase precedes each statement: I am confident I can regularly implement Evidence-based Education when..........

1. Administrators in my school don’t provide enough support.  
2. I feel I don’t have the time.  
3. I feel pressures associated with insufficient teaching materials for students with disabilities.  
4. I feel there is a lack of fit between Evidence-based Education and the state/district policy.  
5. I feel using Evidence-based Education is a mismatch with my teaching style.  
6. I feel that there is no assuring the validity of the evidence.  
7. There is no incentive to use Evidence-based Education.  
8. I experience complications in using Evidence-based Education.  
9. I notice that there are no improvements.  
10. Other teachers tell me that using Evidence-based Education is meaningless.  
11. I don’t have access to internet searching.  
12. My colleagues do not want me to use Evidence-based Education.  
13. External evidence seems to be complicated to use.  
14. I am doing poorly in my job and feel worried.

Section 5: Decisional Balance

Directions: This section looks at positive and negative aspects of using Evidence-based Education (EBE). Please read the following items and indicate how important each statement is with respect to your decision to use EBE or not in physical education classes. Please rate each item by marking only one choice.

1. Evidence-based Education would help me develop teaching skills to satisfy individual needs.  
2. Evidence-based Education may not always work.  
3. Evidence-based Education would help me develop problem solving skills.  
4. It is too much trouble to search for evidence that I want to use.  
5. Evidence-based Education would help students with disabilities to effectively achieve educational goals in physical education.  
6. I believe my real experiences are a much better way to satisfy educational goals of students with disabilities.  
7. Evidence-based Education would improve the quality of physical education.  
8. I don’t have enough time to search for evidence because of my other daily responsibilities.  
9. Evidence-based Education would help me design meaningful tasks and achieve high success for students with disabilities in physical education.  
10. I was never trained to use Evidence-based Education in my teacher education training program.  
11. I would feel more confident making decisions about my teaching by implementing Evidence-based Education.  
12. The gap between evidence and practice definitely exists.  
13. Evidence-based Education would help me minimize wasting time and money to develop appropriate physical education programs.  
14. I am not sure why Evidence-based Education is a better way of providing physical education for students with disabilities.
**Section 6: Processes of Change**

Directions: The following experiences can effect the implementation of Evidence-based Education of some teachers. Think of similar experiences you may have been having or have had during the past few months. Please rate how frequently the event occurs by marking one choice.

<table>
<thead>
<tr>
<th>Event</th>
<th>Never</th>
<th>Seldom</th>
<th>Occasionally</th>
<th>Quite Often</th>
<th>Very Often</th>
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<tbody>
<tr>
<td>1. I look for information to solve problems related to my teaching.</td>
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<td>2. I react emotionally about the consequences of my mistakes while I am teaching students with disabilities.</td>
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<td>3. In a professional conference I realize that I might be able to improve educational outcomes for students with disabilities by using external evidence more often.</td>
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<td>4. I feel more confident when I teach based on external evidence.</td>
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<td>5. I find that school is changing to Evidence-based Education in ways that make it easier to educate students with disabilities.</td>
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<td>6. Instead of only relying on my former teaching experiences, I search for external information from the internet, articles, in-service training, or experts to improve physical education for students with disabilities.</td>
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<td>7. I have a colleague who encourages me to implement best practice when I don’t feel up to it.</td>
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<td>8. I find that I get the benefit of having more teaching skills when I regularly implement best practice.</td>
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<td>9. I make commitments to implement best practice.</td>
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<td>10. I keep attending conferences to remind me to implement best practice.</td>
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<td>11. I think about information from articles and books on how to answer questions in my teaching.</td>
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<td>12. Remembering reports about negative consequences by teaching based on only personal experience upsets me.</td>
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<td>13. Through an in-service training, I realize that if I don’t use external information, I may stay at the same level of teaching skills and be less effective to students with disabilities.</td>
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<td>14. I believe that regular Evidence-based Education will make me a problem-solving teacher.</td>
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<td>15. I read or hear about teachers who have successfully implemented physical education based on external information for students with disabilities.</td>
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<td>16. I make myself use external information to teach students with disabilities in my physical education classes even when the external information is hard to apply.</td>
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<td>17. I have someone who encourages me to do best practice.</td>
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<td>18. I try to think of Evidence-based Education as a way to satisfy the special needs and individual characteristics of students with disabilities in physical education classes.</td>
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<td>19. I believe, if I want to implement best practice, I can do it.</td>
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<td>20. I use a lesson card in my classes to remind me of best practice.</td>
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<td>21. I read articles about how to improve my teaching.</td>
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<td>22. I am afraid of the negative results when I do not implement best practices in my teaching for students with disabilities in physical education.</td>
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<td>23. I think that the structure of gym environments would affect implementation of Evidence-based Education for students with disabilities in physical education.</td>
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<td>24. I would feel better about myself when I implement best practice.</td>
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<td>25. I notice that teachers, who obtained awards based on their teaching, use external evidence in their teaching.</td>
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<td>26. Even when I feel tired, I will do best practice anyway.</td>
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<td>27. I surround myself with people who are trying to improve their teaching.</td>
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<td>28. I reward myself for taking small steps toward implementing best practice.</td>
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<tr>
<td>29. I tell myself that I can keep implementing best practice if I try hard enough.</td>
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<td>30. I try not to associate with teachers that “roll out the ball.”</td>
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</tbody>
</table>

Thank you very much for your time and help!!

Please RETURN to Oregon State University using the included envelope and stamp.
Informed Consent Document for a Web-based Survey

Dear Colleague

You are invited to take part in this study designed to develop a measurement system for change of teaching behavior and intention to implement Evidence-based Education (EBE) for students with disabilities in physical education classes. This study will help us develop a validated measurement system in order to understand physical educator’s current stages to use EBE. We believe that it is important to identify the teachers’ readiness and current stage to use EBE, prior to simply emphasizing the importance of EBE.

We would appreciate it if you would take about 20-25 minutes to respond to the online questionnaire. Your identity will not be made public if the results of this project are published. Your participation in this study is voluntary and you may refuse to answer any question(s) for any reason. Only researchers at Oregon State University related to this study will have access to the information you provide, which will be kept confidential to the extent permitted by law.

We hope that, in the future, students with disabilities might benefit from this study because the knowledge that will be gained will be used to improve teacher’s behavior related to physical education to satisfy the special needs of students with disabilities. There will be no risk associated with this study. You will not be paid for your participation, but if you complete the survey you will be included in a random raffle. A winner from the raffle will be notified via email or mail, and be given a $100 gift card via mail.

If you decide to take part in the study, it should be because you really want to volunteer. You will not lose any benefits or rights you would normally have if you choose not to volunteer. You can stop at any time during the study and still keep the benefits and rights you had before volunteering. You are free to skip any questions that you prefer not to answer. If you choose to withdraw from this project before it ends, the researchers may keep information collected about you and this information may be included in study reports.

If you have any questions about this research project, please contact: Joonkoo Yun,
Evidence-Based Physical Education for Students with Disabilities

541-737-8584 or jk.yun@oregonstate.edu or contact Jooyeon Jin, 541-737-5927 or jinj@onid.orst.edu.
If you have questions about your rights as a participant, please contact the Oregon State University Institutional Review Board (IRB) Human Protections Administrator, at (541) 737-4933 or by email at IRB@oregonstate.edu.

By clicking the “I Agree” button below, you indicate that you agree to take part in this study. Thank you in advance for your help. We highly appreciate your cooperation.

☐ Agree
☐ Disagree
### Evidence-Based Physical Education for Students with Disabilities

#### Section 1-1: Background Information 1

Directions: This section is for gathering information about your background and school environment. Please clearly mark your responses.

1. What is your gender?
   - [ ] Male
   - [ ] Female

2. How old are you?

3. Number of years teaching physical education

4. What is your highest degree?
   - [ ] Bachelor's Degree
   - [ ] Master's Degree
   - [ ] Doctoral Degree
   - [ ] Other (please specify)

5. Year received highest degree

6. What kind of teaching certifications do you have? (mark all that apply)
   - [ ] General Physical Education
   - [ ] Classroom Teacher
   - [ ] Health Teacher
   - [ ] State Endorsement in Adapted Physical Education or Certified APE
   - [ ] Other (please specify)

7. What is your primary responsibility in your school? (mark all that apply)
   - [ ] Classroom teacher
   - [ ] Physical Education teacher
   - [ ] APE teacher
   - [ ] Special education teacher
   - [ ] Other (please specify)
Evidence-Based Physical Education for Students with Disabilities

Section 1-2: Background Information 2

8. You are currently teaching (mark all that apply)
   [ ] Elementary school
   [ ] General physical education
   [ ] Middle school
   [ ] Adapted physical education
   [ ] High school

9. What is the Zip code of your school?

10. Does your school have segregated physical education classes for students with disabilities?
    [ ] Yes
    [ ] No

11. Are students with disabilities included in regular physical education class at your school?
    [ ] Yes
    [ ] No

12. Do you have students with disabilities (e.g. learning disability, autism, physical disability, etc.) in your classroom?
    [ ] Yes
    [ ] No
    [ ] I don't know

13. Do you have an Individualized Education Program (IEP) for your students with disabilities?
    [ ] Yes
    [ ] No
    [ ] I don't know

14. How many minutes per week do your students have physical education?
    [ ] 30 - 60
    [ ] 70 - 120
    [ ] 130 - 180
    [ ] 190 - 240
    [ ] Other (please specify)

   [ ]
## Evidence-Based Physical Education for Students with Disabilities

### Section 2-1: Stages for Evidence-based Education

Directions: In this survey, Evidence-based Education (EBE) is defined as the best practice of integrating individual teaching strategies with the best available evidence from internet, articles, experts, professional conferences, and/or in-service training. This section attempts to classify you into a stage of change regarding implementation of EBE. Please carefully read the following questions, and mark either yes or no as appropriate.

1. How do you find answers to questions or solve problems related to teaching PE? (Mark All that apply)

   - [ ] 1. Using Own Expertise
   - [ ] 2. Using Own Experience
   - [ ] 3. Asking Experts
   - [ ] 4. Searching Internet
   - [ ] 5. Reading Articles
   - [ ] 6. In-Service Training

2. Have you regularly used external information, such as articles, experts, in-service training, or the internet to improve teaching PE?

   - [ ] Yes
   - [ ] No

3. Have you thought about using external information, such as articles, experts, in-service training, or the internet along with your expertise and experience to improve teaching PE?

   - [ ] Yes
   - [ ] No
Evidence-Based Physical Education for Students with Disabilities

Section 2-2: Stages for Evidence-based Education

4. Have you been regularly using external information, such as articles, experts, in-service training, or the internet with your expertise and experience to improve teaching PE for at least the past six months?

- [ ] Yes
- [ ] No
## Evidence-Based Physical Education for Students with Disabilities

### Section 2-3: Stages for Evidence-based Education

5. Do you intend to use external information, such as articles, experts, in-service training, or the internet within the next month to improve your teaching?

- [ ] Yes
- [ ] No
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Section 3: Stages for readiness to implement Evidence-based Education

Directions: This section is to understand your readiness to implement Evidence-based Education (EBE). Please mark the ONE STATEMENT of the five alternatives that best describes your readiness to implement EBE in your physical education classes for students with disabilities.

Emotional readiness to implement EBE is defined as satisfying Each of the Three Following Criteria:

1) I accept that EBE is a framework for better physical education for students with disabilities.
2) I understand what EBE means.
3) When I have questions (problems) related to teaching physical education, I am willing to use external information, such as articles, experts, in-service training, or the internet to answer the questions.

☐ I am not intending to meet the three criteria to be emotionally ready to implement EBE in the next six months.
☐ I am intending to meet the three criteria to be emotionally ready to implement EBE in the next six months.
☐ I am intending to meet the three criteria to be emotionally ready to implement EBE in the next 30 days.
☐ I have met the three criteria but less than six months ago.
☐ I have met the three criteria for more than six months.
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Section 4: Self-efficacy

Directions: Listed below are 14 statements designed to assess your beliefs in your ability to use Evidence-based Education under various circumstances or conditions. Please rate each statement as it applies to you and your situation. Please mark only one choice per statement.

The following phrase precedes each statement: I am confident I can regularly implement Evidence-based Education when..........

<table>
<thead>
<tr>
<th>Statement</th>
<th>Not at all Confident</th>
<th>Not Confident</th>
<th>Uncertain</th>
<th>Confident</th>
<th>Completely Confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrators in my school don't provide enough support.</td>
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<td>I feel I don't have the time.</td>
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<td>I feel pressures associated with insufficient teaching materials for students with disabilities.</td>
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<td>I feel there is a lack of fit between Evidence-based Education and the state/district policy.</td>
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<td>I feel using Evidence-based Education is a mismatch with my teaching style.</td>
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<td>I feel that there is no assuring the validity of the evidence.</td>
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<tr>
<td>There is no incentive to use Evidence-based Education.</td>
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<td>I experience complications in using Evidence-based Education.</td>
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<td>I notice that there are no improvements.</td>
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<td>Other teachers tell me that using Evidence-based Education is meaningless.</td>
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<td>I don't have access to internet searching.</td>
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<tr>
<td>My colleagues do not want me to use Evidence-based Education.</td>
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<tr>
<td>External evidence seems to be complicated to use.</td>
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<td>I am doing poorly in my job and feel worried.</td>
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</tbody>
</table>
APPENDIX G: INTERNET BASED INSTRUMENT (Continued: page 9)

Evidence-Based Physical Education for Students with Disabilities

Section 5: Decisional Balance

Directions: This section looks at positive and negative aspects of using Evidence-based Education (EBE). Please read the following items and indicate how important each statement is with respect to your decision to use EBE or not in physical education classes.

Please rate each item by marking only one choice.

<table>
<thead>
<tr>
<th>Item</th>
<th>Completely Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Completely Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Evidence-based Education would help me develop teaching skills to satisfy individual needs.</td>
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<td>2. Evidence-based Education may not always work.</td>
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<td>3. Evidence-based Education would help me develop problem solving skills.</td>
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<td>4. It is too much trouble to search for evidence that I want to use.</td>
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<td>5. Evidence-based Education would help students with disabilities to effectively achieve educational goals in physical education.</td>
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<td>6. I believe my real experiences are a much better way to satisfy educational goals of students with disabilities.</td>
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<td>7. Evidence-based Education would improve the quality of physical education.</td>
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<tr>
<td>8. I don’t have enough time to search for evidence because of my other daily responsibilities.</td>
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<td>9. Evidence-based Education would help me design meaningful tasks and achieve high success for students with disabilities in physical education.</td>
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<td>10. I was never trained to use Evidence-based Education in my teacher education training program.</td>
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<td>11. I would feel more confident making decisions about my teaching by implementing Evidence-based Education.</td>
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<td>12. The gap between evidence and practice definitely exists.</td>
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<td>13. Evidence-based Education would help me minimize wasting time and money to develop appropriate physical education programs.</td>
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<td>14. I am not sure why Evidence-based Education is a better way of providing physical education for students with disabilities.</td>
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</table>


**Evidence-Based Physical Education for Students with Disabilities**

**Section 6-1: Processes of Change 1**

Directions: The following experiences can affect the implementation of Evidence-based Education of some teachers. Think of similar experiences you may be currently having or have had during the past few months.

**Please rate how frequently the event occurs by marking one choice.**

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Seldom</th>
<th>Occasionally</th>
<th>Quite Often</th>
<th>Very Often</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>○</td>
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<td>2.</td>
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<td>3.</td>
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<td>4.</td>
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<td>5.</td>
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<td>6.</td>
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<td>7.</td>
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<td>8.</td>
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<td>9.</td>
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<td>10.</td>
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<td>11.</td>
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<tr>
<td>12.</td>
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<tr>
<td>13.</td>
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<tr>
<td>14.</td>
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<td>15.</td>
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</tbody>
</table>
APPENDIX G: INTERNET BASED INSTRUMENT (Continued: page 11)

Evidence-Based Physical Education for Students with Disabilities

Section 6-2: Processes of Change 2

Directions: The following experiences can effect the implementation of Evidence-based Education of some teachers. Think of similar experiences you may be currently having or have had during the past few months.

Please rate how frequently the event occurs by marking one choice.

<table>
<thead>
<tr>
<th>Event</th>
<th>Never</th>
<th>Seldom</th>
<th>Occasionally</th>
<th>Quite Often</th>
<th>Very Often</th>
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</thead>
<tbody>
<tr>
<td>16. I make myself use external information to teach students with disabilities in my physical education classes even when the external information is hard to apply.</td>
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<td>17. I have someone who encourages me to do best practice.</td>
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<td>18. I try to think of Evidence-based Education as a way to satisfy the special needs and individual characteristics of students with disabilities in physical education classes.</td>
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<td>19. I believe, if I want to implement best practice, I can do it.</td>
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<td>20. I use a lesson card in my classes to remind me of best practice.</td>
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<td>21. I read articles about how to improve my teaching.</td>
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<td>22. I am afraid of the negative results when I do not implement best practices in my teaching for students with disabilities in physical education.</td>
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<td>23. I think that the structure of gymn environments would effect implementation of Evidence-based Education for students with disabilities in physical education.</td>
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<td>24. I would feel better about myself when I implement best practices.</td>
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<td>25. I notice that teachers, who obtained awards based on their teaching, use external evidence in their teaching.</td>
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<td>26. Even when I feel tired, I will do best practice anyway.</td>
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<td>27. I surround myself with people who are trying to improve their teaching.</td>
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<tr>
<td>28. I reward myself for taking small steps toward implementing best practice.</td>
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<tr>
<td>29. I tell myself that I can keep implementing best practice if I try hard enough.</td>
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<tr>
<td>30. I try not to associate with teachers that &quot;roll out the ball.&quot;</td>
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</tbody>
</table>