TEACHING-LEARNING PATTERNS OF EXPERT AND NOVICE ADAPTED PHYSICAL EDUCATORS

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This study was intended to provide a description of teaching and learning patterns seen in the lessons taught by experts and novices in Adapted Physical Education. Two experts who had won previous state teaching awards and served in leadership positions in state associations were filmed and their lessons were analyzed first to develop a systematic observation instrument specifically intended for adapted physical education lessons. After going through a literature-based protocol for using filmed lessons to develop instrumentation, the newly developed Adapted Physical Education Teacher Education (APETE) instrument was used to analyze lessons by the two experts and 11 novice teachers completing their senior year at a northeastern university. Conditional probabilities were generated with the use of the Behavioral Evaluation Taxonomy & Strategy (BEST) software (Sharpe & Koperwas, 1999) and the triad chains were used to complete a matrix on the experts' and novices teaching and learning patterns. Results support earlier findings showing more of an instructional focus of novices than those in research on lessons taught by novices in general physical education.

Understanding what expert teachers do better than novice and less-effective teachers is important for teacher educators so that preservice teachers can be more effective when entering inservice teaching. Teacher education researchers have suggested that knowing the characteristics of expert and effective teachers (Hansen, 2008; Rink, 2003; Shulman, 1987) provides a model of thinking and acting compared to those with less experience and who demonstrate less effectiveness (Borko & Livingston, 1989; Berliner, 1986; Stronge, 2007). With the complexities of the classroom increasing each year, teachers need to know and understand their subject matter more than ever (Shulman, 1986), yet also be able to interject that knowledge in a way that shows teacher capacity in a diverse learning environment (Cochran-Smith, Feiman-Nemser, McIntyre, & Demers, 2008; Shulman, 1987). That capacity includes knowing how to present the curricular content with appropriate learning strategies that will impact a variety of learners' needs. As Jane Addams (1990) commented in her work on socialized education and expanded in Hansen’s review (2008) called “Why educate teachers,” inexperienced individuals cannot be expected to understand or know what an experienced teacher or scholar does. Although teacher
preparation programs can attempt to provide the pedagogical content knowledge on top of subject matter knowledge, the literature is clear that effectiveness and expertise comes with experience in the classroom.

This is no different in the physical education classroom and can be translated into the adapted physical education setting as well. Research-based evidence shows that physical education experts and novices think and act differently during the instructional process within lessons (Housner & Griffey, 1985; Griffey & Housner, 1991; Siedentop & Eldar, 1989). For example, experts react more quickly to ongoing events in the classroom than do novices (Housner & French, 1994). It is clear that not all experienced teachers are experts and novice teachers can be effective, but that experience is a necessary but not sufficient condition by itself for developing teacher expertise (Berliner, 1986; Vogler, van der mars, Cusimano, & Darst, 1992). In addition to the qualitative research published by Housner and Griffey (1985) on the cognitive processing of experts and novices and by Griffey and Housner (1991) on the teaching characteristics found in lessons of novices and experienced teachers with and without expertise, Hawkins and his colleagues at West Virginia University (WVU) took a complex, behavior analytic approach to provide rich teaching and learning patterns of novices and experts as teacher actions occurred (Hawkins, Sharpe, & Tacy, 1992; Sharpe & Hawkins, 1992). The WVU research analyzed the field systems in lessons which provided a look at how each of the individual teacher behaviors interacted in the teaching context with other behaviors. That is, if action “A” occurred, what are the chances that it was followed by action “B” and then followed by action “C”? These stimuli and responses within the lesson field offers a unique description of the teaching-learning process that other research methodologies are not able to capture, although the low number of research subjects limits the generalizability of findings (Bakeman & Gottman, 1986; Sharpe, Hawkins, & Ray, 1992; Sharpe, 1997). Additionally, one similar study used an ABAC multiple baseline design with treatment reversal to determine the efficacy of a feedback protocol in field-based and peer-based settings (Sharpe, So, Mavi, & Brown, 2002). The methods used included systematic observation tools that recorded actions of teachers and students as they taught with a relatively low number of participants deemed appropriate for this type of research design. The findings in each of these real-time-based systematic observation, field systems or sequential behavior analytic studies (Sharpe, 1997) support the qualitative findings of other researchers studying expertise, experience, and effectiveness in physical education in terms of planning and decision-making as well as those who used ALT-PE-related measures to study not only planning and decisions of preservice teachers (Byra & Sherman, 1993), but the impact of feedback following the instruction of preservice teachers to peers (King, 2008; Landin, Hawkins, & Wiegand, 1986). Findings in the adapted physical education literature support other research findings regarding the differences between experts and novices. In one earlier study, experienced teachers with subject-matter and contextual expertise were found to have superior knowledge base and repertoire of instructional strategies at their disposal (Solmon & Lee, 1987).

This theoretical model of teaching expertise and effectiveness described above is based on the work of Dreyfus and Dreyfus (1986) which held that a teacher moves from novice to expertise over a timeline of several years. The novice/advanced beginners’ stage is associated with gaining experience where they exhibit rule-governed elements of teaching without a meaningful ability to change or respond to the flow of events in the classroom (Berliner, 1986). The next stage in this model is the competent/proficient stage.
which involves the ability to make decisions based on previous experiences that have occurred within the first three to five years of experience. Classroom routines are repeated at this stage to the point that what works and does not work are considered enabling a better flow of the learning activities during each lesson. The final stage is the experienced/expert stage which takes at least six years within the same context (same setting, grade level, subject matter, etc.). This stage involves more teacher intuition with functions that have become automatic, allowing flexibility for making decisions about subtle classroom events (Berliner, 1986).

This type of automaticity seen in expertise and the attention to rules by novices is also seen when teaching physical education to K-12 students with disabilities (DeMarco, 1999: Livingston & Borko, 1989). While supporting the findings related to expertise in Adapted professionals, DeMarco (1999) provided a look at primary characteristics seen in lessons taught by four different Adapted Physical Education experts. Vogler, van der Mars, Cusimano, and Darst (1992) compared novices with experts in Adapted Physical Education, but used two types of expertise, that based on years of teaching as well as expertise based upon criteria. The comparisons of the experts and novices were studied in relation to classes with and without students with disabilities included. The investigators measured the Academic Learning Time in Physical Education (ALT-PE) of the lessons which included students with disabilities and without students with disabilities. Findings suggested that what teachers did in these lessons differed little due to experience or expertise. The main significant difference found was that classes with included students generated more off task behaviors and less time engaged in the subject matter motor tasks of the lessons. The differences between class-types did not change due to experience or expertise. These results comparisons included lessons with disabilities and those students without disabilities did not support the idea that greater automaticity and time management issues (Berliner, 1986) occurred in lessons taught by teachers with less experience.

Additionally, research has demonstrated that the peer tutors working with students with disabilities can impact the amount of time students are engaged in learning in adapted physical education lessons (Webster, 1987). In a related study, children with autism had higher amounts of ALT-PE than what is recommended when included in regular physical education classes (Lisboa, Butterfield, Reif, & McIntire, 1995). These findings and earlier findings have demonstrated that students with certain disabilities can participate successfully in physical education, whether in an inclusive setting or self-contained. These types of data are beneficial for determining the level of engagement in the subject-matter motor tasks when teachers adapt physical education for students with disabilities.

Lorenzi (2008) used ALT-PE variables to study expert adapted physical educators. His research was based on finding what effective skills and environmental factors are essential for stimulating optimum learning in a quality elementary physical education program that values inclusion. Additionally, he looked compared and contrasted the inclusion practices of an expert and novice physical educator. Although Lorenzi employed qualitative means to gather some of the findings from two physical educators (expert and novice), two elementary school principals, and two others in leadership roles in the district, he also used the WVUTES software for documenting the ALT-PE variables associated with the teachers and students in the expert and novice lessons. His findings are supported by the literature which indicates that novices focus more on managerial issues and do not anticipate or respond as experts do while teaching. Lorenzi's work is important
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though in determining how experts and novices can impact how much students with disabilities are successfully engaged during physical education lessons, especially with the relatively sparse amount of work on instructional patterns that impact learning in adapted physical education. While these findings from Lorenzi's research are helpful and somewhat unique in the field of adapted physical education, it may be helpful to look at more complex interactions between what teachers and students do in these types of lessons taught by experts and novices. Perhaps research emulating the earlier work of behavior analysts such as Hawkins and Sharpe can provide a look at not only the successful engagement in activity by students with disabilities but a look at patterns of experts and novices in relation to how the student responses interact with the teachers' actions.

Although some critics with pragmatic research methodological tendencies continue to assault the use of behavioral perspectives in research (Lincoln & Guba, 2000), Patton (1990) suggests that process evaluations are aimed at "elucidating and understanding the internal dynamics of how a program, organization, or relationship operates .... (and of importance is the ability) to look not only at formal activities and anticipated outcomes but they also investigate informal patterns and unanticipated interactions (pp. 95)." For example, when students do the opposite of what a teacher would like, it is probable that the teacher's actions are contributing to the unwanted behavior. It is impossible to interact with others without both influencing and being influenced (William R.L., 1999). A behavior analytic approach allows researchers to document the multiple interactions with students with the multiple interactions of a teacher in a complex environment. Understanding what students do in a given situation or setting after a specific teacher comment or response is the underlying thrust of educational behavior analytic research from a technological base. That is the underlying principle between the proposed methodology for this study, the purpose of which was to create an observation system based on expert and novice adapted physical education lessons and to use that system to determine the teaching and learning patterns of experts and novices in adapted physical education.

Methods

Informed Consent, Institutional Review, and School Research Approval

Written and informed consent was provided by parents of the K-12 students with disabilities for the children to be filmed and for their data to be used in this research. Student assent was obtained as well. Permission from the local school district was provided by the superintendent for the research to be conducted as well. K-12 Schools Research committee approval was also obtained for expert filming in self-contained adapted physical education lessons. Approval was also granted from the university Institutional Review Board prior to beginning the study.

Novice Teachers (preservice teachers)

During an entire semester, senior health and physical education preservice teachers enrolled in an adapted physical education teaching methods course were assigned K-12 students with various types of disabilities to whom they would teach weekly lessons during the semester. The preservice teachers were assigned to teach multiple K-12 students with disabilities for two 30-minute lessons each week. In the first lesson, one or more students were taught by the preservice teacher in the university gymnasium space for 5-6 weekly lessons and in the university pool for 4-5 lessons. Each of the preservice teachers was scheduled for filming once during the semester during the lessons taught within the gymnasium space. This filming rotation schedule allowed four lessons per week to be filmed. However, technical difficulties (scheduling, battery issues, and incorrect
filming protocols) limited the number to 11 preservice teachers with appropriate filming protocols completed. Depending on the severity of the disabilities assigned to the preservice teachers, lessons were taught to 1-3 individual K-12 students at a time for 30 minutes of actual instruction and learning activity time in a gymnasium space. The lessons were directly related to fundamental movement skills and involved moving the students through a series of movement/skill progressions.

**Expert Teachers**

Additionally, two expert adapted physical education teachers with over 20 years teaching experience who were also state teaching award winners were filmed for 30 minutes as they taught individual K-12 students physical education lessons. A third expert was filmed but technical difficulties with the film prevented lesson data to be analyzed. However, for this type of research using sequential behavior analysis (Sharpe, 1997), researchers have used only one expert for comparative purposes in past research (Everhart & Vaughn, 2005; Sharpe & Hawkins, 1992), providing validation for the use of two experts in this study. Everhart (1994) used similar methods (field systems analysis) to study an expert physical education teacher near downtown Detroit and an expert teacher in suburban Detroit. He found more of a managerial focus and higher intensity of communication by the urban teacher than what was seen in the more affluent suburban environment of the suburban expert teacher. The primary criterion for expert selection was the recognition by peers in the field in the form of previously winning a state professional association award as the Adapted Physical Education Teacher of the Year.

**Filming and Coding Procedures**

The filming process made sure that both the teacher and the assigned K-12 students were in the screen at all times and that the voice of the teacher could be heard at all times. Once the film was captured for each student, the films were analyzed by two observers to establish a descriptive narrative to provide a step-by-step record of everything that the students and the teachers did in the lessons. Common themes and categories were obtained from the narratives which allowed specific teacher and student behaviors or actions to be configured into a systematic observation instrument software program developed by Educational Consulting (Sharpe & Koperwas, 1999) called the Behavioral Evaluation Strategy & Taxonomy (BEST). The teacher and student behaviors that emerged included 11 teacher behaviors and five student behaviors that were grouped into a systematic observation instrument called the Adapted Physical Education Teacher Education (APETE) instrument (see Figure 1). The behaviors and actions were identified with keys on the computer keyboard, allowing observers to press and hold down a key when behaviors and actions occurred in lessons thus allowing the software program to document the duration, frequency, probability, and other real-time measures associated with what the teachers and students would be doing in lessons. Once the behaviors and actions were configured into BEST, a lesson with an adapted physical education teacher was observed and coded by trained observers. Inter-observer agreement (IOA) was established at .80 between two observers within a specific reliability protocol. Following the establishment of IOA, the films of the experts were observed and coded using the BEST software to generate real-time variables and more complex patterns of stimulus-response-response by the experts and novices. That is, the response by students to the stimulus provided by the teacher was coded and the subsequent response by the teacher to the student response followed. This provided a pattern of triad chains which allowed the software to indicate the conditional probabilities of these patterns at alpha levels of .05, .01, and .001. This allowed the investigators to deter-
### Teacher categories

- **Observation (1)**
  - The teacher watches specific students and the class as a whole during the allocated lesson time.

- **Encouragement (2)**
  - Before the student attempts a task, the teacher provides encouragement such as, “You can do it!”

- **Positive feedback (3)**
  - After a student attempts a task, the teacher tells the student exactly what he or she is doing well. An example would be, “You did a great job jumping over the hurdles!”

- **Correctional feedback (4)**
  - The teacher tells the student how to fix a task or skill and/or the teacher breaks down the skill so that the student can perform it successfully.

- **Management (5)**
  - The teacher sets up, moves, or puts up equipment and/or uses students to help for this purpose. Instructions to students related to organizing equipment or positioning students is also included in this category.

- **Visual demonstration (7)**
  - The teacher demonstrates a skill or task as she is explaining it so the students can see exactly what they need to do.

- **Clear Verbal Instruction (6)**
  - The teachers speak loud and clear so every student can hear her directions. The teacher will wait until the kids are quiet before she begins her directions. The teacher only gives one direction at a time.

- **Provide physical assistance with movements and activities (8)**
  - The teachers will physically move the students limbs if they need help with a motor skill. For example, the teacher will place her hand on the students arm to help them throw, or grab their hand to help them jump.

- **Non-related verbal (9)**
  - The teacher speaks to students about non-lesson related topics to show personal interest. An example might be when the teacher says to each student… Hi __________, How are you today? How are you feeling? How was your weekend? “

- **Laugh/Smile (L)**
  - The teacher is continually laughing or smiling to help motivate the students. This can be ongoing while other actions / behaviors are occurring. (toggled)

- **Challenge the student to improve (0)**
  - The teacher challenges the student to improve by making tasks or skills harder after they have completed the original task or skill. For example, jumping over low hurdles and then using higher hurdles. Dribble a basketball 10 times in a row after dribbling it 8 times in the previous repetition.

### Student categories

- **Enthusiasm (E)**
  - The student shows excitement or enthusiasm during the lesson by clapping, smiling, laughing, or yelling.

- **Focus when given 1 on 1 attention (F)**
  - The student shows facial or body language that demonstrates the student is working hard to successfully perform the task or skill given by the teacher. The student is on task and not wandering around, trying to do something else.

- **Performing skill/task/game (A)**
  - The student is executing the skill or task as instructed by the teacher.

- **Successful skill/task attempt (S)**
  - The student successfully performs a task or skill given by the teacher.

- **Student management (N)**
  - The student helps set up or put away equipment.

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Figure 1. Definitions of teacher and student behaviors within the Adapted Physical Education Teacher Education (APETE) instrument.
mine how probable the likelihood would be for the experts and novices patterns to include a repertoire of specific stimuli and responses that typically occurred together. Once the films were observed and data were collected on the experts and novices using BEST, the data triad chains with at least three occurrences in the lessons and significant at the .05 alpha level as triad chains were then grouped and displayed in tables showing patterns associated with managerial and instructional tendencies.

**Matrix Development**

Once the data were collected, a process was created during which the triad chains were ranked in order of how frequently the triad chains occurred together as a package and those which were statistically significant at an alpha level of .05. These rankings were then displayed on a table with a graph of those which occurred more frequently (see Figures 2 and 3). The rankings table was different for the list of triads for expert lessons and those listed for the novice lessons which provides a rationale for the different triad behaviors seen on the experts and novices matrices to be developed with the use of the rankings tables. After the rankings table of triad chains was developed for the experts and for the novices, the triad chains were then organized in a matrix for experts and a matrix for novices so that the triad chain patterns were displayed within a matrix that enabled behaviors and actions with a more instructional focus were grouped near the top left of the matrix (see Figures 4 and 5). Conversely, those with more of a managerial, non-instructional focus were grouped closer to the bottom right of the matrix. In order to highlight the instructional behavioral triad chains, a gray shade was inserted into the top right quadrant of the matrix.

**Results**

When the triad chains were ranked according to frequency of occurrence in lessons and statistical significance at an alpha level of .05 for conditional probabilities of triads occurring together in lessons, the researchers were able to construct matrices for expert and novice lessons based on the rankings of the triads (see Figures 2 and 3 for the rankings tables). Because the triad chains had different conditional probabilities that were statistically significant according to expert lessons and novice lessons, the matrices for documenting the teaching and learning patterns have different components of the triad chains for experts and novice lessons. For example, the novice teaching and learning patterns demonstrate a reliance on corrective feedback grouped with instruction and physical guidance by the teacher in some way, while the experts did not use corrective feedback and physical guidance as much. Because of this, the matrix of learning patterns for the novices displayed corrective feedback as a column in the gray shaded quadrant highlighting triad components with more of an instructional focus (see Figure 5). This did not occur in the same significant manner in the experts' lessons which included more demonstrations as responses to stimuli (first or second behavior in the triad chains) and little, if any, episodes of corrective feedback included as components in the triad chains (see Figure 4). Positive feedback of a general nature was present in the experts' lessons, but not feedback with a specific intent to correct performance. Aside from the exclusion of corrective feedback in experts' matrices and more of a reliance on demonstrations as responses to stimulus responses of students in the triad chains, results indicated that the novice teachers' patterns closely resembled those of the two expert teachers. Evidence of this is seen by noticing the gray shaded quadrants of the matrices in which experts and novices patterns with triad chains with statistically significant conditional probabilities displayed in the gray quadrants. This shows more of an instructional intent because
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<table>
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<th>PATTERN</th>
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**Abbreviation Key**
- Obs = Observation
- Enc = Encouragement
- Fdb = Feedback
- Cfb = Corrective Feedback
- PosFb = Positive Feedback
- Inst = Instruction
- Other = Other
- NonV = Non-task Verbal
- Demo = Demonstration
- StMan = Student Management
- Man = Management
- Guide = Guidance

Figure 2. Ranking of experts' teaching-learning behavioral triad chains in order of conditional probabilities and statistical significance at an alpha level of .05.
### NOVICE TRIAD PATTERNS

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</table>

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Figure 3. Ranking of novices teaching-learning behavioral triad chains in order of conditional probabilities and statistical significance at an alpha level of .05.
the highest ranked triads were more instructional in nature than the rest of the chains on the matrix.

While a few patterns focused on the managerial behaviors, the novice teachers and experts appeared to teach in a way that an instructional focus was seen when viewing the matrices. The conditional probability patterns of the stimulus actions of the teachers followed by student responses and subsequent teacher responses appear to indicate a similarity of function by the experts and novices in terms of an instructional focus over a non-instructional focus. While the statistically significant conditional probabilities that were grouped in triad chains included a predominance of instruction by the teacher grouped with other instructionally-related behaviors (physical guidance, feedback, demonstrations, etc...), the primary difference between the experts and novices in this regard was that the novices tended package different behaviors within the triad chains while the experts focused on the same types of behaviors within the triad chains. For example, Figure 4 shows the first two behaviors of the experts' triad chains seen in the gray quadrant were always followed by the first behavior in the chain to make up the entire triad chain. That is, instruction followed by guidance was followed more by instruction again than anything else when looking at triad chains which were statistically significant. However, the instructional focus was high in expert and novice lessons. Further, the novice lessons rarely had any managerial behaviors exhibited in triad chains which is why the matrix for novices has fewer columns and the least instructional type of behavior was observation of students performing the tasks.

**Discussion**

While research on physical education teachers in the regular physical education classroom clearly shows that novices do not anticipate student responses nor have the ability to respond themselves to students as experts do, this research shows something different for the self-contained Adapted Physical Education classroom. In support of previous findings in the Adapted Physical Education literature (DeMarco, 1999; Livingston & Borko, 1989; Vogler, van der Mars, Cusimano, & Darst, 1992), a lack of expertise and experience did not seem to cause novices to focus more on managerial issues as might occur in non-adapted physical education lessons with or without students with disabilities included (Housner & Griffey, 1985; Griffey & Housner, 1991; Rink 2003). Indeed, both the experts and novices appeared to teach in a way that an instructional focus was much more evident than might be seen with novices in research completed in regular physical education classrooms. Perhaps the constant focus on fewer students in a self-contained environment may have played a part in this. Additionally, since the preservice teachers were enrolled in a semester-long introductory adapted physical education class and were required to teach weekly lessons, they had the benefit of getting feedback as a group weekly on their lessons and their teaching and were able to make changes for each subsequent lesson. This may have played a part also in the reduction of more of a managerial focus into one that was more characteristic of more experienced teachers with more expertise.

While more managerial patterns were seen in the expert lessons, although they were not ranked highly on the table of conditional probabilities of triad chains, this may be explained in part by the more intense real-life setting of an inservice teacher in a self-contained classroom. The novices had support of university faculty, classroom teachers coming with the K-12 students in the lessons, and volunteers to help support the instruction. It may be that when the setting is more intense and with student populations requiring more focus by the teacher, managerial actions are seen more
Figure 4. Matrix of experts’ behavioral triad chains with conditional probabilities statistically significant at an alpha level of .05.

(Everhart, 1994). Again, though, the highest ranked triad chains for the experts (and novices) had more of an instructional focus.

**Limitations**

One limitation to the study was the combination of a variety of disability types in the participant population being instructed during the weekly clinical teaching practicum. However, this still allowed for the development and use of an observation instrument designed to analyze teaching and learning patterns such as the newly-developed Adapted Physical Education Teacher Education (APETE) observation instrument which emerged from this research. It also allowed the novices to plan and implement lessons, allowing the researchers to collect and analyze data related to...
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**Behavior Abbreviation Key**

Obs = Observation
Enc = Encouragement
Fdb = Feedback
Cfb = Corrective Feedback
Inst = Instruction
Demo = Demonstration
Guide = Guidance
Man = Management
NonV = Non-task Verbal
Other = Other

Figure 5. Matrix of novices’ behavioral triad chains conditional probabilities statistically significant at an alpha level of .05.
the level of motor engagement in lessons. The rationale for this was that research does not differentiate between student sub-population groups in lessons when providing conclusions regarding the characteristics of experts and novices in physical education. Having said that, it would be wise to continue similar investigations and provide more of a narrow focus on the population groups in regard to specific disabilities and grade level.

Another limitation was having only two experts participating in the study, although other studies with similar methodologies incorporated comparative analyses employing sequential behavior analytic means (Everhart, 1994; Hawkins, Sharpe, & Tacy, 1992; Sharpe & Hawkins, 1992; Sharpe, So, Mavy, & Brown, 2002).

Implications

Since there has been little published research to date on the teaching patterns and methodologies of adapted physical education teachers, future research should focus on expanding this research area. Specifically, researchers should examine inservice adapted physical education teachers at all levels, including experts and novices, in order to determine the type of teaching methodology that appears to be successful in an adapted physical education setting. Additionally, future research could focus on the impact on subsequent teaching performance when using data-based teaching and learning patterns feedback, (Landin, Hawkins, & Wiegand, 1986) whether from other observers or self-reflection (author, under review) provided from instruments such as BEST. Future research could also focus on the impact on subsequent teaching performance when using data-based teaching and learning patterns feedback, (King, 2008; Landin, Hawkins, & Wiegand, 1986) whether from other observers or self-reflection (author, under review) provided from instruments such as BEST.

References


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