ISSN: 2230-9926

Available online at http://www.journalijdr.com

IJDR

International Journal of
DEVELOPMENT RESEARCH

International Journal of Development Research
Vol. 06, Issue, 07, pp.8521-8524, July, 2016

Full Length Research Article

ABILITY, SPECIFIC KNOWLEDGE, SELF-REGULATION, EPISTEMOLOGICAL BELIEFS, VERSUS MOTIVATION TO PERFORMANCE OF PHYSIOTHERAPY STUDENTS

***Virendra Singh Rajpurohit, Ajeet Kumar Saharan, Sunita Sharma**

Department of Physiotherapy, Maharaj Vinayak Global University, Jaipur 302028, India

ARTICLE INFO

Article History:

Received 10th April, 2016
Received in revised form
25th May, 2016
Accepted 14th June, 2016
Published online 31st July, 2016

Key Words:

GPA, GRE,
Motivated Strategies for Learning Questionnaire (MSLQ), California Critical Thinking Skills Test (CCTST).

ABSTRACT

Background: Case-based learning (CBL) is being utilized in medicine, nursing, and physiotherapy educational programs as a method to improve problem solving, critical thinking, and decision making. Although the use of CBL has increased, the student characteristics that predict performance during case-based instruction have not yet been determined. To advance understanding of important predictors, the purpose of this study was to determine whether student's cognitive ability, motivation, and self- regulation predict their performance on case-based domain-specific knowledge and critical thinking.

Methods: Participants included 25 students from two professional programs of physiotherapy in Jaipur in the second year of a Bachelor of Physiotherapy program. Prior to participating in a 16-week case-based course, students completed the Motivated Strategies for Learning Questionnaire (MSLQ), the California Critical Thinking Skills Test (CCTST), the Epistemological Belief Questionnaire, and a multiple-choice test of domain-specific knowledge. Students then analyzed 10 case studies during the course. Each case study contained knowledge questions, and four of the cases included critical thinking questions requiring critical thinking. Then two hypotheses were tested: (a) Students' general abilities (GPA and GRE—Verbal), prior knowledge, general critical- thinking skills, epistemological beliefs, self-regulation and motivation predict performance in case-based learning as assessed by an outcome measure of case-specific knowledge and (b) students' general abilities (GPA and GRE—Verbal), prior knowledge, general critical-thinking skills, epistemological beliefs, self-regulation and motivation predict performance in case-based learning as assessed by an outcome measure of case-specific critical thinking.

Result: The results of the tests of the hypotheses showed that GPA was the only predictor of case-based knowledge, and GPA, GRE—Verbal, CCTST, and the critical thinking measure of the MSLQ predicted case-based critical thinking. Self-regulation contrary to the hypothesis, did not predict case-based critical thinking. The predictors only account for a small percentage of the variance in the outcome measures suggesting that other variables may account for case- specific knowledge and case-based critical thinking. These results emphasize the need for more research and the development of more sensitive tools for measurement of the variables assessed in this study.

INTRODUCTION

The rapid growth of health-care knowledge and increasing need for skills of problem solving, critical thinking, and clinical decision making have created a crisis in physiotherapy education. New graduates no longer have the opportunity to spend their first years of practice developing these skills under the mentorship of senior practitioners. Students in physiotherapy are expected to enter the health-care profession already proficient in these skills, as well as skills of collaboration and self- regulated learning.

****Corresponding author: Virendra Singh Rajpurohit***
Department of Physiotherapy, Maharaj Vinayak Global University, Jaipur 302028, India.

Attention to the development of these skills escalated when the physiotherapy profession raised their entry-level degree to the PhD in Physiotherapy, a degree that requires increased autonomy in practice and increased responsibility for diagnosis. To enable graduates to assume these responsibilities, accreditation standards for physiotherapy programs require that students attain problem-solving skills and that educators adopt learning activities that develop these skills as well as outcomes measures to assess their students' achievement of these skills specific to the domain of physiotherapy. One pedagogical method that has been touted as an effective tool for developing the skills of problem solving and critical thinking is case-based teaching or case-based learning (CBL), a derivative of the problem-based

learning (PBL) approach widely used in educational programs in medicine (Barrows, 1986). CBL begins with some instruction for knowledge acquisition. Cases are then given to students requiring them to think critically in applying and synthesizing their knowledge as they make clinical decisions about the case. Case-based teaching methods have been increasingly used in helping medical students develop the skills of higher-level thinking and decision making about ambiguous problems, skills required of today's health-care professionals (Knirk, 1991). The beliefs that case studies are motivating and can transform learners into effective problem solvers and critical thinkers is widely held among educators (Shulman, 1992) as well as students (Dochy, Segers, van den Bossche, and Struyven, 2005). However, these beliefs have been challenged by research findings suggesting that student's personal characteristics can impede their ability to learn from cases (Dutton, 2003; Ertmer, Newby, and MacDougall, 1996). To explore this problem, the purpose of this study is to determine if student's characteristics of general ability, domain-specific knowledge, epistemological beliefs, motivation, and self-regulation skills are related to student motivation and performance in case-based learning in physiotherapy.

Factors Related to Performance during Case-Based Learning

Although case-based learning is believed to be a promising way to promote problem solving and critical thinking, some problems may exist with this approach. After 100 years of using the case-based approach we still lack evidence that case-based methods are more effective than lecture or discussion approaches in promoting problem solving and critical thinking (Shulman, 1992). The research of Ertmer *et al.* (1996) suggested that some students lack motivation for case-based learning and raises questions about whether case-based instruction is the most effective way for all students to learn information and applications. Ertmer *et al.* found that when cases were used as an instructional method with veterinary students, some students learned better than others. Specifically, a group of 58 students in a biochemistry class in their first-year of a veterinary program completed two measures of self-regulation skills prior to beginning the course. On the basis of their performance, five students scoring high and four students scoring low on the self-regulation measure were interviewed three times over the semester to investigate their reactions to the case-based learning in the course. In the Ertmer study, eight of the nine veterinary students reported an increase in interest, value, and motivation when case studies were used in biochemistry class.

Students with high levels of self-regulation were able to maintain their motivation, interest, and value throughout the course, whereas those students rated as low self- regulating experienced lower motivation due to other academic pressures. In a similar study of case-based learning in a physiotherapy program, Burnett and Pierson (1988) looked at two groups of 35 first-year students taking a problem-solving course. Although more than 75% of the students believed that the course would help them develop problem-solving skills and rational decision-making abilities, only 31% believed that the course was important. As students shifted into the second half of the course, they found that many students became unenthused, uncomfortable, and less motivated as they attempted to shift to the higher level of cognitive thinking required in problem solving. On the basis of qualitative data, Ertmer *et al.* (1996) concluded that the case- based method was highly motivating for students who were high self-regulating, that is, for those students who possessed - the ability and motivation to implement, monitor, and evaluate various learning strategies for the purpose of facilitating knowledge growth. Students who were low in self-regulation skills experienced motivational and learning problems. Case-based learning presents students with demands that require them to regulate their own learning. That is, they must complete a variety of complex tasks including analyses of problem situations, in which they must make judgments about the relative importance of competing pieces of evidence, make decisions with multiple alternatives, use others as resources, and project possible outcomes of proposed recommendations-skills that are generally considered part of self-regulation (Zimmerman, 1990). Consequently, self-regulation may be a critical skill required for success in case-based learning. Any attempt to explore the self-regulation strategies necessary to succeed in case-based learning must also explore the motivation and task value that students associate with authentic and real life cases. A link appears to exist between the motivation and value that is attributed to domain-specific cases and the self-regulation that is required for using skills of problem solving and critical thinking to solve a case.

Although attitudes and self-regulation have been studied in relation to case methods (Ertmer *et al.*, 1996; Hayward and Cairns, 1998), little evidence is available regarding the relationship between self-regulation and problem solving during case- based learning. Ertmer *et al.* (1996) proposed that motivation (interest, task value, and efficacy) was related to the veterinary student's learning from cases. Of greatest relevance to the study proposed here, Dutton (2003), in a quantitative study of 171 occupational therapy students, investigated the relationships suggested in the qualitative study of Ertmer *et al.* Dutton examined the relationship of epistemological beliefs, motivation, and metacognition (self-regulation) to the student's performance in case-based courses in occupational therapy. From a path analysis of her data, Dutton found that grade point average (GPA) in prerequisite courses, the epistemological beliefs that knowledge is simple and that cases are protocols predicted student's grades on case assignments in their classes, but motivation and metacognitive beliefs did not predict those grades. Several weaknesses in Dutton's study may have accounted for the failure of motivational and metacognitive variables to predict student's performance on cases: (a) Students differed in their year in their program (Some were in the first year of their program and others were in the second year of their program, and some were undergraduates and others were master's students. The difference in year in the program was related to differences in metacognition, motivation, and student's scores on the outcome measure); (b) the outcome measure of student's performance on cases differed in different classes and, most important, (c) ceiling effects on measures may have limited the ability to detect relationships. Dochy *et al.* (2005), in a study of educational science, economics, and law students at various stages of their education, noted that educational phase or year

had a large influence on student's perception of CBL and outcomes and in a previous meta-analysis (Dochy, Segers, Vander Bossche, and Gijbels, 2003) found that the type of assessment and the more accurately it evaluated specific student skills, the more capable it was of ascertaining effects of CBL. The National Board of Medical Examiners (NBME) Step II exam assessed clinical knowledge rather than clinical performance and both the essay question and oral examination part of the NBME evaluated integration of knowledge rather than application. Although the previous three tests did not adequately assess problem- solving skills, other assessment tools such as the standardized patient simulations and authentic cases were classified as successfully measuring skill of the students to apply their knowledge in authentic situations. The study proposed here is designed to address these weaknesses by (a) studying students at the same point in their program, (b) using the same outcome measures for all students, and (c) the use of outcome measures that are more sensitive to student differences.

Purpose of the Study

The purpose of this study was to investigate the relationships of the predictor variables of general ability (GRE and GPA), domain-specific knowledge, problem solving ability, epistemological beliefs, self-regulation, and motivation for case-based methods to the outcome measures of general and specific problem solving performance and domain-specific knowledge of physiotherapy students engaged in case-based learning. To study this relationship, several focus questions guide this research. What is the relationship among student's general cognitive abilities (verbal and analytical GRE), their epistemological beliefs, motivation, and self-regulation prior to and following a course in which students analyzed 10 case studies? Do student's general abilities, prior knowledge, epistemological beliefs, motivation, and self-regulation predict their performance in case-based learning specific to domain-specific knowledge and domain- specific problem solving performance.

Hypothesis

Hypothesis 1: Student's general abilities (GPA and GRE Verbal), prior knowledge, general critical thinking skills, epistemological beliefs, self-regulation, and motivation predict case-specific knowledge during case-based learning.
Hypothesis 2: Student's general abilities (GPA and GRE Verbal), prior knowledge, general critical thinking skills, epistemological beliefs, self-regulation and motivational predict case-specific critical thinking during case-based learning.

MATERIALS AND METHODS

Participants

The participation of 150 physiotherapy students in the second year of their professional program was solicited from two similar physiotherapy programs in Jaipur. All students had a minimum overall GPA of 2.5 and a combined GRE (verbal and quantitative) of 1000 to enter the program. All students have maintained an overall GPA of 3.0 during their first year of the academic program. Students were enrolled in coursework that includes application of therapeutic skills to patients with primary neurological injuries. The courses were similar in objectives, teaching methods, required texts, and readings, case studies, and grading.

General Ability (GPA, GRE, Knowledge)

Student's pre-professional GPA and GRE scores (verbal and quantitative), and first-year GPAs were collected on all students. Prior knowledge about curriculum content was assessed using a battery of questions study guides for national board exams (O'Sullivan and Siegelman, 2007. The accrediting body for physiotherapy education, the Commission on Accreditation in Physiotherapy Education (CAPTE), has developed evaluative criteria for all physiotherapy education programs (APTA, 2006). These criteria encompass the expected entry-level skills that graduates should possess and are evaluated through the National Physiotherapy Examination administered by the Federation of State Boards of Physiotherapy (FSBPT). The FSBPT works closely with CAPTE to develop valid and reliable scores on the national licensure exam. Various study guides with multiple-choice questions similar to those on the national exam have been developed. Each study guide has explicit questions focused on (a) the four practice areas of physiotherapy: musculoskeletal, integumentary, cardiopulmonary, and neuromuscular and (b) the essential elements of physiotherapy practice as specified by the Guide to Physiotherapy Practice (APTA, 2001): examination, evaluation, diagnosis, prognosis, and intervention. A battery of knowledge questions (total of 50) representative of the information contained in the neurology coursework were selected for this study from the study guides to cover the practice area of neurology and the two essential elements of evaluation and intervention in physiotherapy.

Epistemological Beliefs

Schommer (1990) developed a 63-item Likert-type scale that identifies five dimensions of epistemological beliefs (simple knowledge, certain knowledge, omniscient authority, innate ability, and learning is quick). Hofer and Pintrich (1997) questioned the validity of innate ability and quick learning as dimensions of epistemological beliefs. Other researchers questioned Schommer's original factor analysis and validation of the 63-item Likert scale measure (Schraw and Sinatra, 2004). In response, Qian and Alverman (1995) used 53 of Schommer's original 63 items in a factor analysis of the Epistemological Belief Questionnaire and developed a revised 32- item instrument measuring a three-factor model with factors named (a) Learning Is Quick, (b) Knowledge Is Simple and Certain, and (c) Ability to Learn Is Innate. Items are scored on a 6-point Likert-type scale ranging from (0) strongly disagree to (5) strongly agree.

Conclusion

In this study I examined the relationships between the cognitive abilities and motivational characteristics of students in graduate physiotherapy programs to determine if these specific abilities and characteristics predict student's performance on assessments of their knowledge and critical

thinking in the analysis of cases of physiotherapy-patients while participating in a case-based course. Although case-based instruction has been purported to be effective in developing practical and theoretical knowledge, bridging the gap between theory and practice and encouraging the application of professional judgment and decision making, it places demands on students that differ from other instructional methods. Several studies have linked motivational and self-regulation variables (Angel *et al.*, 2000; Demarco *et al.*, 2002; Ertmer *et al.*, 1996) to the optimal use of case studies and academic performance. In a qualitative study, Ertmer *et al.* found that veterinary students with lower initial scores in self-regulation lost motivation near the end of the case-based course. Links also have been found between general cognitive ability, sophisticated epistemological beliefs, and academic performance in case-based courses (Dutton, 2003). The first goal of this study was to identify the variables that predict success on student performance with case-based studies. Clarification of these relationships could provide a basis for experimental studies in which the variables identified as predictors of knowledge and critical thinking about cases might be enhanced.

Acknowledgement

It is my esteemed pleasure and privilege to share my deep sincere thanks and gratitude to all those who helped me during this project. First and foremost I would like to express my sincere thanks to my Supervisor/ Guide, Dr. Vinod Kathju, (MS - Ortho), Prof., HOD Department of Orthopedic, for his ever boosting criticism. I thank him for lending me his valuable suggestions, time, help and his outstanding contribution that has enlightened my path on this subject and helped me to find solution of every problem. I thank him for lending me his precious suggestions, time, help and his contribution that has enlightened my path on this subject and helped me to complete my study. My acknowledgement cannot be completed without expressing thanks to my subjects for their co-operation. I am deeply indebted to my friends for their generous help and without their help I would not be able to complete my work. Lastly but not less importantly I am short of word to thank my family for their blessings, outpouring love, unfailing support. Finally thanks God for giving me confidence in myself.

REFERENCES

Alexander, P. A., White, S. C., Haensly, T. A., and Crimmins-Jeanes, M. 1987. Training in analogical reasoning. *American Educational Research Journal*, 24(3), 387-404.

American Philosophical Association. 1990. Critical thinking: A statement of expert consensus for purposes of educational assessment and recommendations. ERIC Document Reproduction Service No. ED315423).

American Physical Therapy Association, 1991. Contemporary management of motor control problems: Proceedings of II STEP Conference. Alexandria, VA.

American Physical Therapy Association, 2005. III STEP: Neurology Section. Retrieved October 23, 2007 from http://www.iiistep.org/IIISTEP.

American Physical Therapy Association, 2006. Commission on accreditation of physical therapy education. Evaluative criteria for accreditation of education programs for the preparation of physical therapists. Alexandria, VA. Retrieved October 23, 2007 from http://www.apta.org/AM/Template.cfm?Section=CAPTE1andTemplate=/Tagged Page/Tagged Page Display. Cfm and TPLID.

American Physical Therapy Association. 2007. APTA Vision Sentence for Physical Therapy 2020 and APTA Vision Statement for Physical Therapy 2020. Retrieved October 23, 2007 from http://www.apta.org/vision2020.

American Physical Therapy Association. 1997. Physical Therapy Clinical Performance Instrument. Alexandria, VA.

American Physical Therapy Association. 2001. Guide to physical therapist practice. Physical Therapy, 81, 9-744. 2nd Edition.

American Physical Therapy Association. 2004. A normative of physical therapist professional education: (Version 2004. Alexandria VA.

Angel, B. F., Duffey, M., and Belyea, M. 2000. An evidence–based project for evaluating strategies to improve knowledge acquisition and critical-thinking performance in nursing students. *Journal of Nursing Education*, 39(5), 219- 228.

Balogun, J.A. 1988. Predictors of academic and clinical performance in a baccalaureate physical therapy program. *Physical Therapy*, 68(2), 238-242.

Barrows, H. 1986. Taxonomy of problem-based learning methods. *Medical Education*, 20, 481-486.

Barrows, H., and Tamblyn, R. 1980. Problem-based learning: An approach to medical education. New York: Springer.

Blumenfeld, P. C., Soloway, E., Marx, R. W., Krajcik, J. S., Guzdial, M., and Palincsar, 1991. Motivating project-based learning: Sustaining the doing, supporting the learning. *Educational Psychologist*, 26, 369-398.

Braten, I., and Stromso, H. I. 2005. The relationship between epistemological beliefs, implicit theories of intelligence, and self-regulated learning among Norwegian, postsecondary students. *British Journal of Educational Psychology,* 75, 539- 565.

Buehl, M. M., Alexander, P. A., and Murphy, K. M. 2002. Beliefs about schooled knowledge: Domain specific or somain general? *Contemporary Educational Psychology*, 27, 415-449.

Buehl, M. M.,and Alexander, P. A. 2001. Beliefs about academic knowledge. *Educational Psychology Review*, 13(4), 385-418.

****