DOI:10.6129/CJP.201909_61(4).0008
中華心理學刊 民 108，61 卷，4 期，417-438
Chinese Journal of Psychology 2019, Vol.61, No.4, 417-438

Learning and Instruction are the Backbone of Educational Psychology

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Educational psychology involves the study of how people learn and the instructional process in order to know more about how to help people learn best. There is a tradition for education to lean on learning theories from psychology, for early psychological studies such as memory and practice caught the eyes of educators. Nevertheless, psychology theory focused more on individual learning process and was domain general. It is almost impossible to satisfy the complex educational system where individual difference and diversity is the norm. In this thesis, the author went back to the mid-1960 when cognitive psychologists explored the processes of learning different content domains and social construction was introduced to form instructional designs. Then the emergence of educational technology and cooperative, collaborative learning prevailed in the research. It seems that educational psychology has established its discipline. However, after examining the educational psychology textbooks, the fact is that most of them do not catch up with the trend, neither the cognitive process of domain content learning nor the collaborative learning. It is argued that the content of textbooks should be revised and even altered to meet the trend in order to make a way for future teacher's professional development of learning and instruction.

Keywords: *domain relevant, educational psychology, social construction*

Introduction

Educational psychology involves the study of how people learn, including the learning process, the instructional process, learning outcomes, and individual differences in learning (Mayer, 1987/1997; Slavin, 2011/2013). Since the beginning of the 20th century, it has been highly dependent on the theory and methodology of the psychology of learning. In general, educational psychology is an implication-oriented discipline that overlaps with many fields, which has led to criticism that it lacks its own distinctive identity. Moreover, the prevailing type of psychological research is laboratory-oriented, domain-general, and focused on individual learning processes. It is characterized by concern for a high degree of experimental precision. This style of research may not take into account the complexity of education, and it therefore has been criticized for its lack of classroom relevance. Berliner (1993) traced the history of educational psychology in an article titled "The 100-year journey of educational psychology: From interest, to disdain, to respect for practice."

In response to the call for research that is scientific and aims to understand individuals in context and develop applications for educational practices, researchers from various disciplines have conducted studies that bridge the psychology of learning and instruction and cognitive sciences. Using the methods and concepts of cognitive psychology, researchers in the 1980s and 1990s examined the knowledge and cognitive processes required in complex subject domains including physics (Chi, Feltovich, & Glaser, 1981; Chi, de Leeuw, Chiu, & LaVancher, 1994), mathematics (Riley, Greeno & Heller, 1983), and others. They studied advanced skills such as reading and text comprehension (Brown & Day, 1983) and the problem-solving skills needed in mathematics (Schoenfeld, 1985). Around the same period, Vygotsky's (1978) theory of human cultural and social development and zone of proximal development (ZPD)

were introduced, and the concepts of the individual in context and situated knowledge were discussed and practiced in research. Vygotsky posited that concepts, values, and modes of thought were initially practiced through social interaction. Ideas of learning as embedded in social community where elaboration and interpretation are regularly practiced and used as scaffolding in regular instruction were transformed into reciprocal teaching to promote text comprehension (Palincsar & Brown, 1984), learning science, and solving mathematical problems (Brown, 1992).

To be more responsive to educational expectations, Brown (1992) introduced concept of design experiments which incorporating teachers, students, and the curriculum to work toward a theoretical model of learning and instruction rooted in a firm empirical base. Brown also proposed effective intervention should go to the regular classrooms operated by teachers and students. Design-based research has since gained increasing ground, resulting in science-based improvements that guide the analysis of teaching practices and the design of new learning environments such as those that use technology in education (Design-Based Research Collective, 2003).

In line with the advances in studies of learning and teaching described above, Lee Shulman (1987) proposed the concept of teachers' pedagogical content knowledge (PCK), which emphasizes the importance of studying teachers' professional knowledge and knowledge of subject matter. Shulman defines PCK as a special kind of knowledge possessed by experienced teachers that constitutes a fusion of subject matter knowledge and the pedagogy appropriate for teaching that particular topic. It includes knowledge about learners and how to represent subject matter knowledge in forms that make it comprehensible to students.

Studying learning and instruction from the perspectives of individuals in context and social construction and focusing on subject domains have become mainstream in educational psychology research.

The Content of Journals of Educational Psychology

To identify the common ground and trends in educational psychology, many scholars have analyzed the research content published in academic journals. Nolen (2009) studied articles published in top-ranked educational psychology journals and identified common areas in empirical research. The journals selected were the Journal of Educational Psychology, Educational Psychologist, the Journal of the Learning Sciences, Learning and Individual Differences, Educational Psychology Review, and Contemporary Educational Psychology. Nolen examined 758 articles published in these six journals from January 2003 through December 2007. The results showed a consistency of research categories, suggesting that there was collective agreement among educational psychologists in the field. Four research topics were commonly studied: classroom achievement, learning and memory, affect/motivation/beliefs, and cognition/reasoning. This agreement countered critics who suggested that educational psychology had no distinctive identity and no common core of subjects (Nolen, 2009).

Pintrich (2000) examined research articles published in Educational Psychologist from 1996 to 2000 and highlighted a trend of synthesis and a multidimensional framework for understanding learning. This framework was a composite of cognitive, motivational, and social components and their multiplicative interactions in real-life settings, which broadened the view of the "individual in context." More recently, Mitchell and McConnell (2012) reviewed articles published in Contemporary Educational Psychology (CEP) from 1995 to 2010. They found that the most frequently occurring topic category was individual differences. The second most frequently occurring topic category was academic subjects, among which reading and mathematics were the most studied. The most prevalent theoretical perspectives used by article authors were cognitive and social cognitive theories (56% and 48%, respectively, among all reviewed articles). The behaviorist approach was found to have waned since 1995, appearing in just 2% of the CEP articles. Furthermore, since 2007, the use of social cognitive

frameworks was more prevalent than the use of cognitive frameworks. Group discussion, persuasive discourse, and classroom contexts were considered as social approaches; cognitive studies of students' thinking, learning, and motivation also took the influence of social aspects into account (Mitchell & McConnell 2012).

Johnson and Johnson (2009) found that cooperative learning was the most utilized social approach to learning in schools in almost every subject area and from preschool through graduate school and adult training programs. The average person cooperating was found to achieve at about two thirds of a standard deviation above the average person performing within a competitive (effect size = 0.67) or individualistic (effect size = 0.64) situation. Thus, Johnson and Johnson (2009) claimed that cooperative learning was an educational psychology success story.

In recent years, technology-enhanced instruction (e-learning) has gained researchers' attention and resulted in a large amount of research published in education and technology related journals, such as the British Journal of Educational Technology, Innovations in Education and Teaching International, Computers and Education, Educational Technology Research and Development, and Journal of Computer Assisted Learning. A review study by Shih, Feng, and Tsai (2008) indicated that among 1027 papers from 2001 to 2005, the most popular topics were an interactive learning environment (110 papers), collaborative learning (92 papers), and metacognition (75 papers). To shed light on the effects of technology in education, Sung, Chang, and Liu (2016) studied research published from 1993 to 2013 on the effect of using a mobile device as a learning tool and found significant effect sizes in subject domains such as social studies (0.77), science (0.57), and language arts (0.47). However, for cooperative learning in technology, the effect size was not significant (0.26).

In Taiwan, Yeh, Chen, Chen, and Tsai (2010) examined and analyzed the articles published in the Bulletin of Educational Psychology (BEP) between 1967 and 2007. The 454 published studies included 14 descriptive articles and 440 original studies, and 33 were in English. These studies were classified into nine categories: counseling and guidance, teacher behavior and teaching, psychological development and adjustment, learning issues, testing and statistics, family issues, special education, gender issues, and others. The findings showed that early research topics were concentrated on learning issues, psychological development and adjustment, teaching, and testing and statistics. However, in the last 20 years of the examined period, the areas of counseling and guidance attracted more research attention, and in the final 10 years, research related to special education had faded from the BEP research focus. One reason for this phenomenon was the establishment of the Bulletin of Special Education in 2003.

Following the classification categories of Yeh et al. (2010), this author examined articles published in BEP from 2008 to 2018 and found that among 287 articles, psychological development and adjustment and learning issues were still the most studied categories. A somewhat different emphasis was the focus on single subject domains, such as mathematics and reading. Reflecting the advancements in technology, there were studies using new tools such as fMRI, but the study of social interaction in learning was still missing from BEP articles.

Overall, content analysis of published articles demonstrates that social interaction and technology are the dominant trends in educational psychology research. Many of these studies have used cooperative learning or group discussion, involved real curriculums and taken longer periods of time to run experiments in many real-life classrooms (i.e., Cantrell, Almasi, Varter, Rintamaa, & Maden, 2010, Li, Murphy, Wang, Mason, Firetto, Wei, & Chung, 2016). Their results are encouraging and positive.

The Content of Educational Psychology Textbooks

Snowman (1997) analyzed the 10 most recent educational psychology textbooks at that time and listed a set of 26 topics that covered all of the content of the 10 texts. Snowman counted the number of pages that were devoted to each topic to indicate the importance

of the topic to the text writer. Snowman also surveyed 20 educational psychology instructors from a variety of colleges and universities about what they taught. They were asked to indicate on a 4-point scale how much coverage the topic received (above average coverage = 4; not covered = 1). They were also asked to rate the necessity and importance of these topics on a 3-point scale. The findings indicated that the following six topics accounted for more than half of the pages in these texts: instructional methods and practices, motivation, information processing theory, classroom measurement and evaluation, classroom management, and intellectual differences. The five topics rated absolutely necessary and important by the 20 educational psychology instructors were motivation, critical thinking/problem solving, information processing theory, social learning theory, and cognitive development. The five most covered topics were information processing theory, operant conditioning, cognitive development, intellectual differences, and moral development. The findings revealed a clear gap between teaching intention and practice. Although Snowman's study was done in 1997, the content adopted in educational psychology textbooks has not changed much since, except in R. E. Mayer's "Educational Psychology: A Cognitive Approach" and R. Slavin's "Educational Psychology." In these two texts, domain-specific learning such as reading, writing, science, and mathematics are presented and discussed. Cooperative learning and scaffolding instruction are also mentioned by Slavin. In sum, the content of the educational psychology textbooks does not include the knowledge revealed by the recent research done in the field.

The following is an example of how researchers have transformed science knowledge into teaching practice. It is a review study done by Rayner, Foorman, Perfetti, Pesetsky and Seidenberg (2001). In the article, the authors offered the starting point of the learner, the learning process, and the end of learning. They are (a) a description of initial states of learners prior to instruction in a domain; (b) explanation of the transition processes from initial to desired states; (c) description of desired end states or goals of instruction; and (d) specification of instructional conditions that promote this transition. It fits what educational psychology is meant to be and do – to study how people learn and the instructional processes. The article is about teaching reading, and the authors are from the disciplines of psychology, pediatrics, linguistics, and education.

After providing an overview of writing systems, Rayner et al. (2001) summarized research from children's language development and the nature of early reading development. They reviewed theories of learning to read, the characteristics of children who do not learn to read, research from cognitive psychology and cognitive neuroscience on skilled reading, and connectionist models of learning to read. They then discussed the implications of the research findings for learning to read and teaching reading. The following conclusions emerged from different sources of evidence, including laboratory and classroom studies on teaching reading: (a) mastering the alphabetic principle where written symbols are associated with phonemes is essential to becoming proficient in reading, and (b) methods that teach this principle directly are more effective, especially for children who are at risk of having difficulty learning to read. It is suggested that elementary school teachers make the alphabetic principle explicit in helping students become skilled and independent readers.

Concluding Thoughts

This chapter starts with the cognitive research trend of learning and instruction and reveals the changes over time in the content of research in educational psychology. This change will continue. For example, the technological feasibility for every teacher and student to be on the Internet and learn will challenge traditional modes of instruction. The focus on social and cultural learning contexts will intensify. However, the content of educational psychology texts remains almost untouched. It is urgent for educational psychologists to lay out a vision of the future of their field that incorporates both the characteristics of traditional and future learning and the qualities of instruction and effective ways of learning. This vision will help instructors of educational psychology to design appropriate curriculums for future educational psychology students.