

INPLASY PROTOCOL

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Effect of Content Knowledge on Students' Learning Achievement: A Systematic Review

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None declared.

Review question / Objective: This review aims to analyze strategies that improve students' learning skills achievement and investigate the effect of content knowledge (CK) on physical education students' learning achievement. The authors systematically searched for relevant publications in six scholarly databases, namely, Emerald, Web of Science, EBSCOHost, SCOPUS, CINAHL, and China National Knowledge Infrastructure. The results show that CK workshops for inservice teachers with a focus on specialized CK can potentially improve their pedagogical content knowledge (PCK) and student skill learning. At the same time, it was found that by enhancing inservice teachers' PCK, students' skills were improved. A series of empirical tests based directly on students' CK learning were also conducted.

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INTRODUCTION

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publications in six scholarly databases, namely, Emerald, Web of Science, EBSCOHost, SCOPUS, CINAHL, and China National Knowledge Infrastructure. The results show that CK workshops for inservice teachers with a focus on specialized CK can potentially improve their pedagogical content knowledge (PCK) and student skill learning. At the same

time, it was found that by enhancing inservice teachers' PCK, students' skills were improved. A series of empirical tests based directly on students' CK learning were also conducted.

Condition being studied: This review aims to investigate the effect of CK on students' learning achievement. The effect of students' achievements involves the effect on students' skills and theoretical studies.

METHODS

Participant or population: grades 1–6 indicate “elementary school,” grades 7–9 are ranked as “secondary school,” and grades 9–12 are classified as “highschool.”

Intervention: When examining the data collection procedures to study the effect of CK on students' test achievement, 12 of the studies under consideration used workshops as the specific intervention (Sinelnikov et al., 2015; Ward et al., 2014; Ward, 2015; Iserbyt et al., 2015; Song et al., 2020; Kim et al., 2018; Iserbyt et al., 2019 ; Sinelnikov et al., 2015 ; Iserbyt et al., 2017; Kim, 2015). On the other hand, two studies used the meeting approach (Jayousi, 2019; Palao et al., 2013). In essence, these studies focused on the “intervention of CK learning methods” as an independent variable and examined whether students' achievement had improved. In summary, the authors of this review noted that several intervention methods were used to conduct CK research, including workshops, meetings, expert interviews, and regular teaching. While workshops and meetings mainly focused on the teachers, standard teaching and video education teaching focused on the students. The results from the studies showed that subsequent to CK interventions, students' skills had significantly improved.

Comparator: Different interventions are compared.

Study designs to be included: The authors have found that the intervention methods include seminars, conferences, and physical education lectures that focus

on teachers. Teachers can rectify the common mistakes of students through the above ways. The usage of these methods has led to significant improvements in the students' skills. On the other hand, standard teaching and video education focus on the students (Palao et al., 2013).

Eligibility criteria: The literature search was conducted in both English and Chinese. There were a total of 984 documents searched across six databases, with 50 additional records identified from supplement sources (i.e., articles from Google Scholar similar to the literature). A total of 1034 articles were screened according to their titles and abstracts. It is important to note that even though the search was initially launched according to titles, abstracts, and keywords, it was found that 448 articles are not directly related to the said theme of this review theme. In addition, 24 non-English and non-Chinese articles, as well as 206 and 159 articles that focus on academic and technological CK, respectively, were excluded. Meanwhile, 586 articles that are duplicates were also removed. During the screening process, 235 articles that do not meet the criteria were discarded. Out of these, 154 do not focus on physical education CK, 10 are conference papers, 53 are non-empirical papers, and 18 are not full texts. Besides that, 295 full-text articles were excluded for the following reasons: no independent variable, no dependent variable, did not study the relationship between CK and students' achievements; conceptual and review of literature papers. Finally, based on the nature of our research questions, we have only included empirical and quantitative research articles, thus excluding 15 purely conceptual and comprehensive literature review papers. Only 351 articles remain after the screening. The second round of screening was conducted with the purpose of ensuring that the articles fulfill the objectives of this study. As a result, several works had to be excluded, including 50 articles that are without independent variables, 48 without dependent variables, and 146 articles that do not study the relationship between CK and students'

achievement. Three kinds of articles were also specifically excluded: (a) 39 essays on teaching CK and working relationships, (b) 15 papers on teaching technological CK and workshop, and (c) 19 articles on teacher training. After a series of strict selection and exclusion, a total of 14 articles that met the inclusion requirements were chosen for the current review.

Information sources: There is no conflict, data, etc. come from their own statistics and analysis.

Main outcome(s): The critical assessment of the 14 articles under consideration showed that the improvement of CK affects students' test scores through the advancement of sports skills. This observation was noted despite the inconsistency in the intervention methods and periods of the different sports events. The results of the research are summarized into the following three parts: Effect of Skills on Students' Test Achievement Investigating the effects of badminton, swimming, volleyball, throwing, crawling, forward climbing, basic life support, and hurdle technology skills on students' achievement showed that: (a) the students in the experimental class have a higher accuracy rate than those in the control class, whereby their badminton skills significantly improved. The results also showed that rich CK behavior has a better impact on students' learning (Ward et al., 2014; Iserbyt et al., 2015; Sinelnikov et al., 2015); (b) all teachers participated in the physical education workshops by elaborating on the achievement results of swimming skills. Before the workshop commencement, the teachers were asked to read the "Complete Guide to Physical Education Manual." During the workshop, they joined sessions to learn about specific swimming content. These teachers then proceeded to teach swimming to the students. Upon analysis, the students' swimming performance in the CK group was found to be significantly higher than those in the non-CK study group, while the rate of insufficient skills significantly decreased (Iserbyt et al., 2015; Iserbyt et al., 2019). In summary, CK has helped

improve badminton, swimming, and volleyball skills. Studies on three sports used workshops with 12–20 hours of training, which involved only teachers and were held without students. Through this method, the teachers were able to learn the skills in the workshop and later applied the same to their teaching (Ward et al., 2014; Sinelnikov et al., 2015; Kim, 2015; Palao et al., 2012; Ward,

Quality assessment / Risk of bias analysis: PRISMA (Liberatti et al., 2009).

Strategy of data synthesis: During the screening process, 235 articles that do not meet the criteria were discarded. Out of these, 154 do not focus on physical education CK, 10 are conference papers, 53 are non-empirical papers, and 18 are not full texts. Besides that, 295 full-text articles were excluded for the following reasons: no independent variable, no dependent variable, did not study the relationship between CK and students' achievements; conceptual and review of literature papers. Finally, based on the nature of our research questions, we have only included empirical and quantitative research articles, thus excluding 15 purely conceptual and comprehensive literature review papers. Only 351 articles remain after the screening. The second round of screening was conducted with the purpose of ensuring that the articles fulfill the objectives of this study. As a result, several works had to be excluded, including 50 articles that are without independent variables, 48 without dependent variables, and 146 articles that do not study the relationship between CK and students' achievement. Three kinds of articles were also specifically excluded: (a) 39 essays on teaching CK and working relationships, (b) 15 papers on teaching technological CK and workshop, and (c) 19 articles on teacher training. After a series of strict selection and exclusion, a total of 14 articles that met the inclusion requirements were chosen for the current review.

Subgroup analysis: Inductive analysis of statistical articles, based on PICOS specific analysis.

Sensitivity analysis: Everything follows academic standards, ethical requirements, normal review.

Country(ies) involved: Malaysia.

Keywords: physical education, students' skill achievement, specialized content knowledge, common content knowledge, intervention method, student evaluation.

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