

Critical Thinking Research: A Scoping Review on Research Gaps

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Abstract This paper is a scoping review of critical thinking (CT) studies done in the Philippines by Filipino scholars from 1971 to 2017, aimed to examine the extent and nature of research that has been conducted to identify research gaps in the existing literature. In doing the scoping review, a five-stage methodological framework was utilized. Out of 142 documents gathered, 128 studies were reviewed and classified into six major research areas. Over the last 47 years, studies have focused largely on CT ability, but studies on CT disposition have been very limited. Immersion is the predominant approach used in teaching CT and in materials development. The majority of studies conducted were designed for students in tertiary and secondary education, but hardly for kindergarten and elementary school pupils. This scoping review suggests that research need to be conducted to cultivate CT disposition towards helping learners in kindergarten and elementary school acquire the skill.

Keywords: critical thinking, Philippines, research gaps, scoping review

Introduction

Realizing the utmost importance of critical thinking (CT) in various facets of life, educators through the years have been professionally concerned about the process of CT and doing research on ways to teach it well (Fisher, 2011). In line with this academic quest, a number of scholars have formulated CT concepts (e.g., Dewey (1909), Ennis (1996), Facione and Gittens (2016), Halpern (2014), Paul and Elder (2021), etc.), which have been adopted by researchers and educators not only in the Philippines but also in other parts of the world. The seminal works of these CT experts have greatly influenced the way researchers and scholars worldwide perceive how CT can be incorporated into instruction, assessment, and research. The fact that many scholars continuously undertake studies and offer insightful concepts on CT reveals a growing interest among academicians to further broaden and deepen the theoretical foundation of CT.

Indeed, CT is considered one of the 21st century skills that individuals need to cultivate to make the most of their concerns, academic or otherwise. In fact, CT is essential to fulfill the personal, civic, and professional responsibilities of every member of this fast-changing and highly technological society (Facione & Gittens, 2016). The population of the Philippines, a democratic country, is estimated at more than a hundred million people and for democracy to flourish and thrive, people need to think critically about relevant issues. They are expected to articulate their reasoned stance and intelligent judgments on sociopolitical as well as economic and moral problems that gravely affect the country. Such involvement is possible only if people are trained to be fair-

minded critical thinkers: individuals who are not controlled by their egocentric and sociocentric tendencies (Paul & Elder, 2021). Failing to use CT skills, specifically during elections, poses a threat to democracy, and, ultimately, to world peace (Sternberg & Halpern, 2020).

The foregoing statements imply that the education sector plays a crucial role in nurturing students to be open-minded, objective, and willing to accommodate viewpoints and perspectives that run counter to their own position. The statement further denote willingness to change their beliefs based on the reasonability of the evidence and presented ideas. Simply put, the education sector must produce individuals who reflect on the issues at hand and are willing to bend their personal views to uphold the truth.

Critical Thinking

Ennis (2013) defined *critical thinking* as “reasonable reflective thinking focused on deciding what to believe or do” (p. 36). His definition suggests that critical thinkers consciously seek and rely on the use of sound reasoning before formulating a conclusion. They examine the reasonableness of their own ideas and arguments and are hospitable to the viewpoints of others. They purposefully and judiciously weigh what beliefs and actions to take in dealing with life situations, knowing that thinking critically is vital for success and survival. In doing these, they consciously utilize CT ability and disposition.

Notably, Ennis’ (2013) conception of CT consists of two major aspects, namely, ability and disposition. The former pertains to the cognitive dimension exhibited in analyzing arguments, whereas the latter is associated with an affective dimension like open-mindedness. When ability and disposition are applied simultaneously, fair-mindedness and intellectual integrity come about (Facione & Gittens, 2016;

Paul & Elder, 2021). For their part, Bailin and Battersby (2016), and Halpern (2014) argued that individuals cannot be considered accomplished critical thinkers if they are only endowed with critical thinking ability without the accompanying CT disposition, or vice-versa. To be considered a thoroughgoing critical thinker, one must have both ability and disposition operating complementarily.

In short, when doing research on CT, it is important to consider both ability and disposition to comprehensively examine the CT concept. Hence, this paper investigated whether Filipino scholars emphasized ability, disposition, or both in the studies they conducted.

Critical Thinking in the Philippine Setting

A number of Filipino educators have acknowledged the lack of CT among learners in Philippine schools (Cruz, 2020; Lugtu, 2018). “Interestingly, the concern about deficient CT skills is not confined to any one country or region, but appears to span education systems around the world” (Stapleton, 2011, p. 14). Dela Cruz (2012) attributed this phenomenon to the kind of pedagogy that is rooted in rote memorization, which the Philippine schools find difficult to do away with. He argued that this lack of critical thinking among Filipino students could be traced back to the kind of education instituted in the country by the Spanish friars and the Thomasites, whose great influence on the present education in the Philippines somehow persists despite modernization. Dela Cruz bewailed that these early teachers heavily perceived rote recall as synonymous with legitimate learning. Sadly, it would seem that this perception has been so deep and pervasive to the dismay of modern educators.

In the same light, Marquez (2017) emphasized that despite the claim of CT integration in many subjects in basic education as well as courses taught in higher education,

Filipinos' CT aptitude remains woefully inadequate. He ascribed this phenomenon to the ineffective integration of teaching CT in Philippine education. He posited that teaching in the Philippines largely hinges on a didactic approach focusing on conveying information to the neglect of making room for reflective teaching and students' independent reflection and analysis. This is observed across the curriculum and year levels.

The aforementioned paragraphs described the deplorable situation regarding the lack of CT among Filipinos. However, no studies have been mentioned as to how much CT research has been conducted in the Philippines in relation to curriculum and instruction, assessment, testing, and materials development across grade levels and academic disciplines. A scoping review that provides a synthesis of diverse studies in CT may be of help to education researchers in utilizing some data-driven concepts on how to address the alarming lack of CT skills among Filipino learners.

Framework of the Study

A scoping study is focused on synthesizing the comprehensive coverage of research conducted regarding a certain topic or issue (Arksey & O'Malley, 2005).

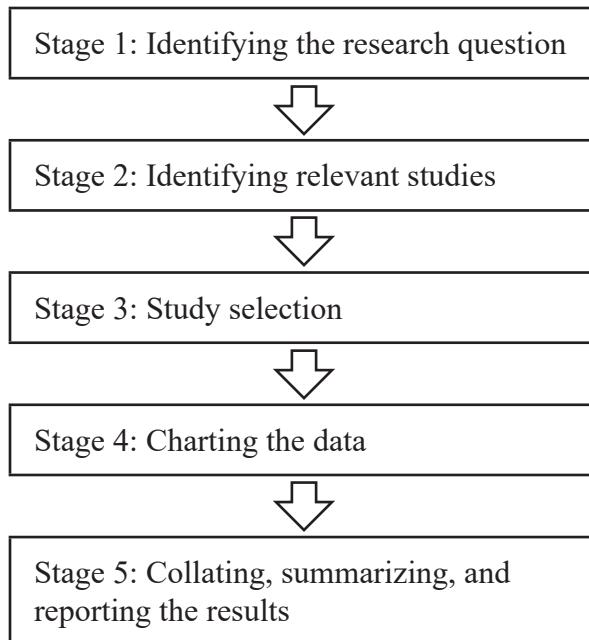
A scoping review is a form of knowledge synthesis that addresses an exploratory research question aimed at mapping key concepts, types of evidence, and gaps in research related to a defined area or field by systematically searching, selecting, and synthesizing existing knowledge (Colquhoun et al., 2014, pp. 1292-1294).

The present study was anchored on Arksey and O'Malley's (2005) five-stage methodological framework for

conducting scoping review. These methodological stages are presented in Figure 1.

Figure 1

Five-Stage Methodological Framework



The five-stage methodological framework was originally designed for conducting medical research. However, the framework was deemed feasible in addressing the central question of the present scoping study, which aimed to determine the research gaps in CT studies that have been done in the Philippines so far.

Methodology

The definition of scoping review coincided with the twofold aim of the current review: first, to review existing studies in CT done by Filipino scholars; and second, to determine the extent and nature of the research available in order to identify research gaps that could set future research directions for Filipino scholars who wish to investigate the field of CT. The research gaps in this study pertain to the identified nature of CT studies like curriculum and instruction, assessment, and materials development, as well as other identified research areas such as aspects of CT, grade levels, academic disciplines, and other factors that have not been explored as yet or are still underexplored.

The document types initially identified for relevant studies consisted of existing journal articles, book chapters, conference proceedings, seminar papers, undergraduate and master's theses, and doctoral dissertations done by Filipino scholars in the Philippines. Relevant studies were searched using various electronic databases.

Considering the unwieldy number of higher education institutions (HEIs) in the Philippines, this paper focused on research done in universities and colleges within the National Capital Region (NCR) or Metro Manila. The relevant documents produced by different HEIs within NCR were accessed through personal visits to the libraries and offices of different academic departments. Interestingly, the inclusive years for the documents covered were from 1971-2017, a span of 47 years. This coverage was established after all the needed documents had been identified and gathered.

Visiting the libraries of all universities and colleges within the NCR was beyond the researchers' capacity. Hence, this paper opted to focus on studies conducted in

private HEIs and state universities and colleges (SUCs) with designations of Center of Excellence (COE), Center of Development (COD), and HEIs with autonomous status, all granted by CHED.

Fit for inclusion in this study were empirical studies in the form of seminar papers, theses, dissertations, journal articles, book chapters, and conference proceedings; research done by Filipino scholars and other nationalities affiliated with HEIs and other schools within NCR; published and unpublished studies written in English or in Filipino only; and all studies that mentioned the operative phrase *critical thinking* or its Tagalog translation, such as *masusing pag-iisip*, *mapanuring pag-iisip*, *kritikal na pag-iisip* in the research title.

On the other hand, excluded were documents that were not data-driven like concept papers, research done outside of NCR, and journal articles which were condensed versions of theses and dissertations that had been identified and included. In this way, duplication of representation was avoided. In the course of study selection, quality assessment of all documents gathered and selected was dispensed with, for it was understood they had been evaluated for quality prior to their publication and acceptance.

Initially, a worksheet was used in preparing abstracts along with concise bibliographic descriptions of all gathered documents. The abstract consisted of the main objective or purposes of the study, methodology, findings and conclusions, and recommendations. Furthermore, six descriptors were assigned for each abstracted document included for classification purposes in each study. These were the main objective of the study (descriptor 1), aspects of CT highlighted in the study (descriptor 2), definition of CT used in the study (descriptor 3), academic discipline where CT was the research focus (descriptor 4), grade level

for which the study was intended (descriptor 5), and CT measures used if any (descriptor 6).

The tabular and chart presentations consisted of the frequency and percentage of included and classified documents. The analysis, which was presented over decades, focused on determining the quantity of documents covered based on the descriptors assigned for each study.

After classifying and charting all the included documents, the researchers detected some recurring themes in the main objective of each document. This objective served as the basis for the formulation of descriptor 1, which is categorized into six major research areas: curriculum and instruction, materials development, assessment, CT in relation to other variables, test development, and CT and culture. The reporting part of the scoping review revolved around these aforementioned areas, which reflected the nature of CT studies in the Philippines, along with the rest of the descriptors.

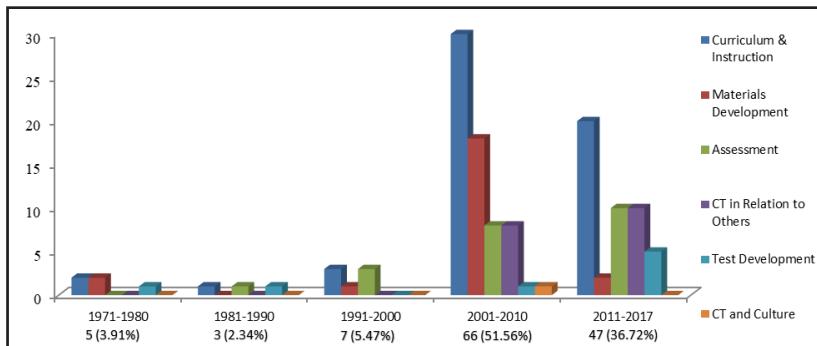
Results and Discussion

CT Studies Conducted from 1971 to 2017

Figure 2 shows the total research outputs on CT done by Filipino scholars in nearly five decades, which started in 1971 and ended in 2017. The 128 studies were categorized into six major research areas. Furthermore, the said figure indicates that curriculum and instruction were the most studied, followed by materials development and assessment. The least number of research was in the area of critical thinking and culture, followed by test development and critical thinking in relation to other variables.

Figure 2

Summary of CT Studies from 1971-2017



Notably, the bulk of the studies conducted were in the two consecutive periods of 2001-2010 and 2011-2017. This may be partly attributed to the information explosion and pervasive disinformation, which demand people to think critically. Sternberg and Halpern (2020) affirmed that the present society needs critical thinkers more than ever to save the world from destruction and counteract the adverse outcomes of fake news. Owing to the said phenomenon, Filipino scholars seem to have realized the value of CT as a research topic relative to human life and preservation of global harmony.

CT Studies Conducted in Different Academic Disciplines

Appendix Table 1 shows the different academic disciplines that integrated CT as the central component of the studies done from 1971-2017. Most of the studies done were in general education subjects, with relatively few in different areas of professional education. Other academic disciplines, specifically those related to professional education, produced scanty number of studies.

Presumably, scholars in professional education disciplines may have the notion that CT is suitably integrated to general education subjects. Thus, they seem to have a view that their instructional focus must be on covering the content of the course materials to equip students with some technical know-how and prepare them for licensure examinations. With the vast amount of research conducted in the general education program, Filipino scholars seem to view the subjects in the said program as an ideal place for the integration of CT. This belief is in conflict with the argument of Swartz (2003) that CT skills can be infused across the curriculum and grade levels. This implies that scholars in the professional education may engage in the integration of CT in the courses they teach.

Studies Done on Major Aspects of CT

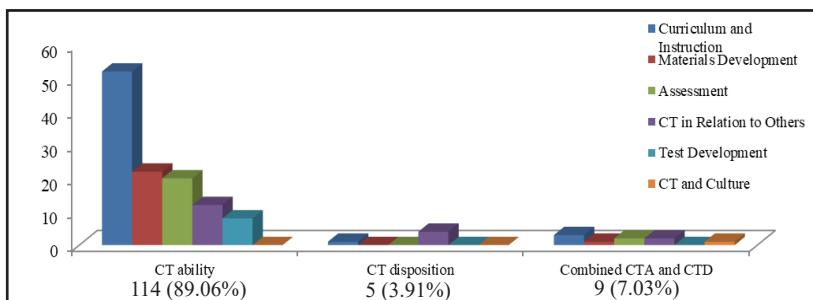
Figure 3 presents the two major aspects of CT, namely, ability and disposition, as integrated in the 128 (100%) research outputs. From 1971-2017, the majority of the studies focused on exploring CT ability, followed by studies that investigated combinations of CT ability and disposition. Few studies concentrated on integrating the disposition aspect of CT.

Reviewing CT studies over the past 47 years, the authors have come to realize that Filipino scholars focused on the ability aspect of CT, neglecting to place equal emphasis on disposition. Apparently, many Filipino teachers hold the restricted view that CT consists only of abilities like analysis, synthesis, and evaluation, which are components of higher-order thinking. They seem unaware that CT involves disposition, which needs to be taught for meaningful acquisition of CT skills. This notion is parallel to the findings of Yuan and Stapleton (2020) that

many teachers have vague and limited understanding of CT concept. Hence, education leaders and researchers may explore studies on how teachers should perceive CT concept for its effective infusion into the curriculum.

Figure 3

Frequency of Major Aspects of CT Integrated in Studies



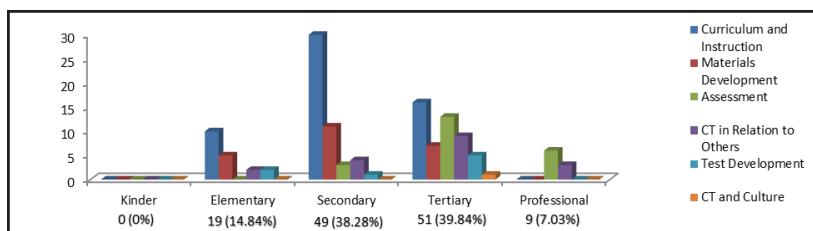
Note. CTA and CTD refer to critical thinking ability and critical thinking disposition, respectively.

CT Studies Done on Grade Levels

Figure 4 indicates the number of studies conducted at different grade levels for nearly five decades. The majority

Figure 4

Frequency of Grade Levels as Focused in Six Major Research Areas



of studies were intended for students at the tertiary and secondary levels. Some studies were conducted for elementary schools and for individuals considered professional employees. No study was done for learners below Grade 2. Presumably, teachers hold the narrow notion that CT can only be learned by individuals at advanced grade levels which contradicted Marquez' (2017) argument that the teaching of CT to young learners may not begin at school but at home. The proper time that a child can be trained to think critically is when the child starts to ask questions and show curiosity to a lot of things. He posited that the most crucial stage for children to develop CT is in their mid to late formative years (5 to 8 years old).

Curriculum and Instruction

The first major research area identified in the present scoping review is curriculum and instruction, defined herein as pedagogical interventions specifically designed to embed CT ability and disposition to the subject matter in the curriculum. This also means offering a separate subject for CT. After a thorough examination of all selected documents, 56 studies were classified in this area. Due to the bulk of the data, the discussion was organized into five sub-areas, namely, CT aspects, academic disciplines, approaches to teaching CT, transfer issues, and grade levels.

The first sub-area which is CT aspects, refers to the two major components of CT, such as ability and disposition, which have been highlighted as integral parts of each study identified as curriculum and instruction. The majority of the studies in curriculum and instruction, as shown in Figure 3, concentrated on exploring CT abilities, with some spillover on studies concerning CT disposition and the combination of ability and disposition. Out of 56 (100%) studies completed, 52 (92.86%) focused on CT ability, one (1.79%) on CT disposition, and three (5.36%) on combined aspects of CT.

The numbers imply that Filipino scholars seem to have devoted their research efforts to CT ability to the apparent neglect of disposition, which is an equally essential aspect of CT.

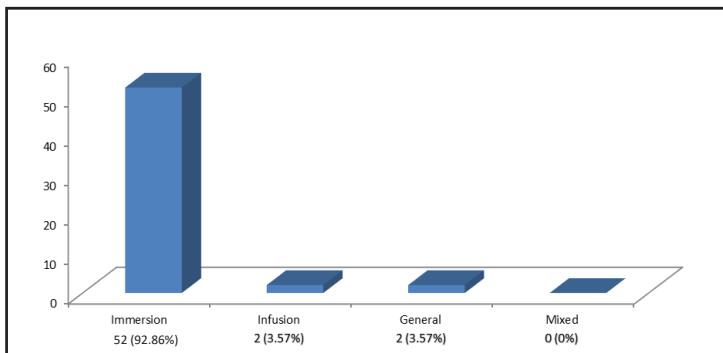
As previously stated, this may be partly due to the fragmented and narrow concept of teachers regarding CT theory (Yuan & Stapleton, 2020). Hence a clear-cut explanation regarding CT needs to be provided. This also suggests that CT disposition may be emphasized in the future research endeavors among scholars in the Philippines.

The second sub-area which is academic disciplines, refers to different branches of knowledge or fields of study that are taught to learners from basic education to tertiary levels. Every study identified as curriculum and instruction was classified according to what curricular subject it belonged to. The bulk of research focused on English, science, mathematics, social studies, and Filipino, which are considered general education subjects in Philippine education from Grades 1 to 12, even at the tertiary level. This suggests that scholars from other academic disciplines, from kindergarten to professional courses at the tertiary level, may consider undertaking CT research exploring curriculum and instruction. This suggestion is congruent with Ennis' (2013) and Swartz' (2003) contention that CT must be an integral part of education across the curriculum.

The third sub-area which is approaches to teaching CT, refers to some sets of principles on how CT is taught in a certain academic discipline. Ennis (2013) explained that there are four basic approaches to teaching CT: general, infusion, immersion, and mixed. He averred that the general approach attempts to teach CT principles separately from the content of the subject matter and can be offered as an independent subject. For Ennis, infusion and immersion are two approaches that embed CT principles in the content of existing subject

Figure 5

Frequency of Four Basic Approaches to Teaching CT



matter offered. Infusion teaches CT principles explicitly along with subject matter to students; whereas, in immersion, CT principles and processes are embedded implicitly in subject matter. Ennis posited that in the immersion approach, students are largely unaware that they are being trained to think critically, and the teaching emphasis is subject matter. A mixed approach is a combination of a general approach and a choice between infusion or immersion.

Classified under curriculum and instruction, the 56 (100%) empirical studies focused on instructional interventions and were classified into three approaches to teaching CT, namely, infusion, immersion, and general. Interestingly, only two (3.57%) studies dealt with infusion approach and two (3.57%) studies dealt with the general approach. The majority of the studies employed immersion in teaching CT, as shown in Figure 5. Regrettably, this suggests that many Filipino educators assign a great deal of importance to subject-matter content, unwittingly neglecting to teach explicitly the principles of CT, which are definitely tools for content mastery. This may partly explain why many Filipino learners lack CT skills.

The fourth sub-area is in relation to the transfer of CT skills originally learned from one topic in a specific academic discipline to be applied to various academic contents and situations in different domains. Halpern (2014) emphasized that the ultimate goal of CT instruction is not only to equip learners with CT ability and disposition in academic context from which these skills were acquired, but also for learners to recognize skillfully when a particular CT aspect is appropriate to apply in certain situations they may encounter. However, this issue of transfer remains largely unaddressed in the research done by Filipinos. From the identified research conducted, only one study considered transfer an integral part of the study. Research is needed in this area.

The fifth sub-area which is grade level, refers to the curricular year level of the educational programs in which a learner is placed and is assumed to perform certain competencies. Most studies on curriculum and instruction have focused mainly on secondary and tertiary levels, as shown in Figure 4. Few studies were conducted on elementary level; in fact, no study was done involving learners below Grade 2. Specifically, secondary and tertiary levels have the most number of studies which were 30 (53.57%) and 16 (28.57%), respectively. A total of 10 (17.86%) studies were intended for elementary pupils: three for the primary level and seven for the intermediate level.

Regrettably, no study was found examining specifically the capability of kindergarten, Grade 1 pupils, and even much younger kids to successfully acquire CT skills at their level, within the limits of their immaturity. Further studies are needed to address these issues.

Overall, despite the number of CT research on curriculum and instruction, this research area is still underexplored. CT disposition has not been given emphasis in the research done by many Filipino scholars. The majority

of the studies conducted focused on general education subjects and less on professional courses at the tertiary level. Despite the efficacy of the infusion approach (Al-Ghadouni, 2021; Ennis, 2013), Filipino researchers seem to focus their scholarly efforts on investigating the effectiveness of immersion. Most of the studies conducted were intended for higher grade levels, specifically the secondary and tertiary levels.

Materials Development

The second major research area identified in this study is materials development, which is the process of developing instructional materials designed for specific grade levels of learners for the enhancement of CT. From 1971 to 2017, a total of 23 (100%) research-based learning materials were developed in the form of undergraduate theses, seminar papers, master's theses, and doctoral dissertations. Out of the 23 studies on materials development, 22 (95.65%) focused on CT ability, and only one (4.35%) infused both ability and disposition, as shown in Figure 3. In a span of 47 years, no study was found on the integration of CT disposition alone in relation to materials development. Most of these learning materials were intended for high school students, as shown in Figure 4, followed by tertiary and elementary. No learning materials were developed below Grade 2. Evidently, learning materials intended for elementary schools were the fewest.

Notably, the learning materials reviewed focused more on the course content than on how CT principles may be utilized to gain mastery of the subject matter. Yuan and Stapleton (2020) affirmed that this situation may be prevalent due to teachers' lack of professional competence in developing appropriate pedagogical activities and instructional materials that foster students' CT skills.

Overall, the Philippines being a multilingual country, it is surprising that there were no research-based learning

materials on CT using major Philippine regional languages like Bikol, Cebuano, and Ilocano, among others, which could have served as tool in acquiring CT for schoolchildren from kindergarten to Grade 3. Research is needed in this area.

Assessment

The third major research area identified in this study is CT assessment, defined as the process of determining individuals' CT ability and disposition by utilizing either standardized CT tests or researcher-made tests to examine individuals' strengths and weaknesses in CT. One of the most striking results in studies on assessment is that 20 (90.91%) out of 22 (100%) of them focused on just assessing CT ability. No study was undertaken assessing CT disposition alone; however, two (9.09%) studies were conducted assessing the combination of ability and disposition.

As shown in Figure 4, no studies were conducted assessing the CT of kindergarten and elementary pupils across levels, considering that these grade levels are the foundation of cognitive development. However, most of the studies on assessment focused on determining the CT of college students. Some of them dealt with assessing the CT of practicing professionals and other adult workers. Very few studies were conducted involving students at the secondary level.

In sum, more research on assessment is needed specifically for elementary pupils in order to determine if their critical thinking skills improve as they move from one grade level to higher levels. In fact, learners in these grade levels begin to think logically or reason about concrete events happening around them (Marquez, 2017), and expectedly, the bulk of studies would focus on these levels. Assessment of pupils in the early grades may provide baseline information in determining their strengths and weaknesses, which is helpful for remediation studies.

Critical Thinking in Relation to Other Variables

The fourth major research area identified in this scoping review focused on studies on the relationship of CT to variables from different academic fields. As indicated in Table 1, other academic fields have not conducted research relating CT to variables in specific academic areas. Two (11.11%) studies were conducted relating both CT ability and disposition to other variables, and four (22.22%) studies were conducted relating CT disposition to other variables. The remaining 12 (66.67%) studies concentrated on CT ability.

Despite empirical studies that established the notion that children are capable of thinking critically (Marquez, 2017), there is a scarcity of studies involving elementary pupils, specifically from kindergarten to Grade 3, relating critical thinking to other variables. Further research may be done for learners below Grade 4, focusing either on critical thinking disposition or combined ability and disposition.

Test Development

The fifth major research area identified in this scoping study was test development, focusing on the construction of CT tests and ways for further validation of existing CT tests in the Philippines. Hence, discussion zeroed in on CT tests developed and further procedures needed in test development.

The first sub-area in this section, which is the construction of a CT test, refers to the research conducted that focused on the CT tests developed by Filipino scholars. In a span of 47 years, five (3.91%) studies on the construction of a CT test intended for Filipinos were conducted. These five CT tests were classified as multi-aspect CT tests, which assess more than one aspect of CT deemed most basic and important for the level of sophistication of target users (Ennis, 2013).

Three of these were subject-specific whereas the other two were general-content based CT tests. The former consisted of items utilizing specific content of particular academic disciplines that aimed to measure CT in individuals; whereas, the latter attempted to measure CT using content from various topics related to daily life experiences. Four of these tests were in multiple-choice question format, while the other one used a mix of matching type and multiple-choice.

As indicated above, these five CT tests assess different aspects of CT ability. Two of these CT tests were constructed specifically for learners in Grades 3 and 6. No CT test whether general-content or subject-specific was developed specifically for Grades 4 and 5 and for pupils below Grade 3. Furthermore, no CT test was developed for elementary pupils on a single-aspect general-content or subject-specific type of test. Ennis (2013) explained that this single-aspect CT test focused on assessing only one specific aspect of the CT ability of individuals, like judging the credibility of sources of information.

At the secondary level, no CT test was developed for secondary students below Grade 10, whether multi-aspect or single aspect for general content or subject-specific. Concerning tertiary level, one CT test was developed that was multi-aspect for subject-specific and another one that was multi-aspect for general-content, indicating the need to develop more multi-aspect and single-aspect for subject-specific and general-content CT tests. As Halpern (2003) emphasized, many more tests on CT need to be developed because improving students' CT skills is not possible without an accompanying component on testing. For nearly five decades, Filipino scholars produced a small number of CT tests focusing on ability; no specific CT test measuring disposition or a combination of both ability and disposition was ever undertaken.

Indeed, the five critical thinking tests developed by Filipinos were not as comprehensive as they should be, for they did not directly and efficiently test for some important critical thinking dispositions like open-mindedness and prudence in drawing conclusions (Bailin & Battersby, 2016; Ennis, 1996; Facione & Gittens, 2016; Halpern, 2014). Research and development are needed to establish how critical thinking dispositions could be directly and efficiently tested along with critical thinking ability.

Concerning the use of some other research procedures for further validation of the existing CT tests as a second sub-area, three (2.34%) research articles were published that focused on construct validity, local norms, and further validation using Item Response Theory. Research is needed to establish other types of test validity of the existing CT tests.

Overall, the five CT tests reviewed were written primarily in English. Interested scholars may consider using different Philippine languages in constructing CT tests, either in multiple-choice or open-ended formats.

CT and Culture

The sixth major research area identified in this scoping study was CT and culture, which deals with the influence of the latter on the former. There is limited empirical research investigating the role of culture in developing CT (Lun et al., 2010), which is true in the Philippine research landscape. From a total of 128 studies, including those from 1971 to 2017, only one (0.78%) was found to have been conducted by a Filipino researcher.

Given the scarcity of research on the role and influence of culture in developing CT skills (Lun et al., 2010), further studies could be explored in this area. Specifically, interested scholars may compare the CT abilities and dispositions of Filipinos to those of Western

nationalities whose first language is English. This is to determine definitively if language and other cultural variables have a significant influence on CT acquisition.

Conclusion and Recommendations

This scoping review examines the extent and nature of CT studies that have been conducted and those that still need to be explored by Filipino scholars. Its main purpose is to identify research gaps that may spur Filipino researchers to conduct studies on CT. Its findings provide direction on emerging research priorities in the areas of curriculum and instruction, materials development, assessment, CT in relation to other variables, test development, and CT and culture.

Following a five-stage methodological framework, this study finds that CT ability has received a lot of scholarly attention among Filipino researchers, but the equally important aspect of CT, which is disposition, has not been adequately attended to. Quite possibly, Filipino scholars might have a novice conceptual understanding of CT as involving higher-order thinking like analysis and evaluation that is fit only for mature intellects. Research on the six aforementioned areas must include both ability and disposition in order to represent the overarching concept of CT. More research at the kindergarten and elementary levels is needed, specifically on the development of instructional materials and pedagogy to address the lack of CT skills among Filipino learners.

It is accepted that the bulk of studies have focused on secondary and tertiary students, but the effort must not stop here. Research focus must now be directed to learners at the kindergarten and elementary levels. The cultivation of CT must start with kindergarten, leading up to tertiary levels in a spiral progression. As previously mentioned,

the children can be trained to think critically when they start to ask questions and their queries are encouraged and enthusiastically responded to. Regrettably, the majority of the research conducted were designed for higher grade levels.

Since 1971, there have been numerous CT studies in curriculum and instruction but it remains a puzzle why CT seems undeveloped. Several Filipino scholars reiterated that many Filipinos remain uncritical because critical thinking is not being effectively and systematically taught in Philippine classrooms. This is corroborated by the findings of this research that immersion, the usual instructional approach used by many Filipino teachers, has been proven to be less effective than other approaches like infusion and mixed. Since time immemorial, the teaching of content seems of primordial importance to the neglect of explicit teaching of CT processes. Hence, the Department of Education and Commission on Higher Education may initiate a policy that promotes the application of other CT approaches in pedagogy and materials development like infusion and mixed approaches which are not thoroughly explored in the research conducted by Filipino scholars.

Since the documents reviewed originated in NCR, researchers across the Philippine regions may do scoping review following the methods used in this study. Comparison of findings from 17 regions of the Philippines may reveal a broader perspective of research gaps on CT in the Philippines. Similar studies may be conducted across academic disciplines focusing on key concepts vital to learners' acquisition of CT, one of the requisite skills in the 21st century.

Summing up, research endeavors that emphasize both ability and disposition to CT are highly recommended. Future research may focus on learners from kindergarten and elementary across levels and disciplines with respect to

identified six areas of CT research done from 1971 to 2017. Undoubtedly, it is a formidable challenge for the education sector officials, researchers, and teachers to effectively and deliberately teach CT ability and disposition as early as kindergarten, continuing CT instruction up to the highest level of schooling; however, the gain in the education of the learners is worth the pain.



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Appendix

Frequency of Studies Done in Every Academic Discipline

Table 1.

	Curriculum and Instruction	Materials Development	Assessment	CT in Relation to Others	Test Development	CT and Culture	Total
English	9	14	4	0	0	0	27 (21.09%)
Science	14	2	3	1	0	0	20 (15.63%)
Psychology	1	0	4	6	5	0	16 (12.50%)
Math	8	0	2	1	1	0	12 (9.38%)
MedRel	2	0	7	3	0	0	12 (9.38%)
Social Studies	7	3	0	0	1	0	11 (8.59%)
Filipino	5	4	0	0	0	0	9 (7.03%)
Info. Tech	2	0	0	3	0	0	5 (3.92%)

	Language Learning						
	0	0	0	3	0	0	3 (2.34%)
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SPED	2	0	0	0	1	0	3 (2.34%)
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Teacher Educ	1	0	1	0	0	1	3 (2.34%)
	<hr/>						
Childhood Educ/Teaching Early Grades	3	0	0	0	0	0	3 (2.34%)
	<hr/>						
Business Ad	0	0	1	1	0	0	2 (1.56%)
	<hr/>						
Nutr/HE	1	0	0	0	0	0	1 (0.78%)
	<hr/>						
LIS	1	0	0	0	0	0	1 (0.78%)
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Total	56 (43.75%)	23 (17.97%)	22 (17.19%)	18 (14.06%)	8 (6.25%)	1 (0.78%)	128 (100%)

Note. MedRel refers to medical-related courses such as Nursing, Physical Therapy, and Health Professions Education. SPED refers to Special Education. Nutr/HE refers to Nutrition and Home Economics. LIS refers to Library and Information Science.