Determining the Role of Teacher Educators in Developing Critical Thinking to Preservice Teachers

Review Article

ABSTRACT

As the research on Critical Thinking (CT) has mushroomed in the field of teacher education thus, understanding Teacher Educators' roles in enhancing CT is inevitable. This study aimed to identify the specific roles that should be played by Teacher Educators in developing CT in the university context. In this study, 22 published research articles were deeply studied and analyzed to unpack the roles of teacher educators in developing CT to preservice teachers. The study proposed three patterns of solutions; (a) Implementing lesson study toward developing CT, (b) Emphasizing critical self-reflection (c) Expanding their understanding of CT teaching through scholarly research engagement. These patterns of solutions proposed were underpinned by related theories to support the application process. Thus, the solutions proposed will help Teacher Educators to become aware of their roles as educators and will assist in preparing teachers who can think critically.

Keywords: Critical Thinking (CT); teacher educator; preservice teacher, roles.

1. INTRODUCTION

With ambiguity on how to teach CT to preservice teachers [1,2,3] very little is known about the roles played by teacher educators to enhance CT during preservice teachers' preparation. As Critical Thinking (CT) is identified as an important attribute in knowledge acquisition, intellectual development, and knowledge utilization to individuals, teacher educators are expected to play a major role in assisting the development of CT in preservice teachers. This dilemma on their roles to enhance CT affected negatively preservice teachers. As a result, many teacher educators teach students to memorize materials which limits preservice teachers to think critically during the teaching process. Freire [4] saw this kind of teaching as a banking system or traditional teaching where teachers deposit materials to students. The study of CT is very important in teacher education, as the Finn [72] Report proposed key competencies such as critical thinking which teacher needs to possess in the 21st Century. This will help teachers to expand their knowledge and skills by understanding education issues from a diverse perspective [5,6]. Also, the acquired CT competencies enabled teachers to modify their teaching pedagogy by leading students to think critically and argumentatively way. Kennedy et al. [7] in their study on CT in teacher education argued that teacher educators should be able to think critically so as to mentor student-teachers in developing CT. Thus, identifying teacher educators' roles in developing CT will help teacher educators themselves as well as preservice teachers in their future classroom practices.

1.1 Definitions of Terms

However, the concept of CT itself is not clear among many scholars [1,8,9] Mgaiwa, 2017. Many scholars [10-23] they shown their contribution to the existing plenty of definitions (e.g., skills, dispositions, goals, actions etc), characteristics as well as interpretation of the concept of CT. According to Encarta [24], the concept is regarded as another form of critical thinking which involve critical analysis with well-disciplined intellectual criticism such as

knowledge of historical context, research, and well-balanced judgment. It involves the ability to think critically, logically, and analytically. Similarly, Fisher et al. [25] defined CT as being skilled and more active in interpretations and evaluation of observations, information, communications, and argumentation. His definition considered CT as making a valued judgment, providing evidence, and constructing theoretical concepts for a general understanding of the question and problem at hand. Based on the nature of this problem which occurred in the aspect of procedural and productive (e.g., [26]), these limit the study to define CT as skills and dispositions. Paul & Elder, (2019) defined CT as a set of complex cognitive skills, such as analysis, evaluation, inferences, and deductive/inductive reasoning. While Yuan and Stapleton, [27] defined CT as some personal dispositions including inquisitiveness, open-mindedness, systematicity, truth-seeking, cognitive maturity, and analyticity. These two dimensions of critical thinking are complying with the main objectives of this study which aimed to understand teacher educators' roles in enhancing critical thinking for preservice teachers.

Another key fundamental question, that anyone can be interested in is how one can measure CT. However, many studies recently have been conducted on how to measure critical thinking among teachers [28,29,30,31,32,33,34] these range of scholars they have been contributed in describing different ways used to measure critical thinking among teachers. For example, the study by Purvis [35]; Abrami et al. [36] identified five key instruments widely used to measure critical thinking. The instruments used to measure are the Ennis-Weir Critical Thinking Essay Test (EWCTET), California Critical Thinking Skills Test (CCTST), Watson-Glaser Critical Thinking Appraisal (WGCTA), California Critical Thinking Disposition Inventory (CCTDI), and Assessment Technologies Institute Critical Thinking Assessment (CTA). In general, these instruments measure CT skills and dispositions such as formulating clear questions, analytics, interpretation and examination of arguments, truth-seeking, stating one's point of view, systematic, seeing other possibilities, explanation, and inferences, open-mindedness, humility, self-confidence, and inquisitiveness.

The study viewed a pre-service teacher as a student-teacher studying in either a public or private ITE institute to gain qualified teaching status in primary school or secondary school upon graduating from their program [37]. While teacher educators are viewed as an instructor preparing preservice teachers for their professional role as a teacher and reflective practitioners. Or instructor at the institute of higher education who teaches preservice teachers [38].

1.2 Context of the Study

Understanding the roles played by teacher educators to enhance critical thinking in preservice teachers, help to improve instructional delivery in the classroom settings as suggested by [39,40]. Their studies found that professional development has a direct contribution to improving teaching and contributes to designing, implementing, and evaluating of the effectiveness teacher professional programs. Consequently, understanding the roles played by teacher educators as major stakeholders will help in designing, implementing, and evaluating the specific teacher professional program on how to fully develop critical thinking for preservice teachers.

Secondly, enlightenment with the first point, this problem matter in the field of teacher education in a sense that, critical thinking can play multiple roles and is not only limited in the classroom setting as identified in this study. Based Sun et al. [39] in their study on shaping professional development to promote the diffusion of instruction experts among teachers, they identified the concept of "*spillover effects*". The concepts revealed that there is the double effect of the training such as the direct effect of attendee performance and indirect effect to others who did not attend the training and whole organization as whole through diffusion. This concept make the author to understand impact of critical thinking in a diverse perspectives such as development of self-regulated learning which develop personal thinking abilities, understanding cultural in diverse perspectives, strengthen collaboration among the colleagues by critically addressing various issues. Therefore, the fruits of critical thinking should be extended from individual level to national and world at large, not be limited around the boundary of classroom setting.

Thirdly, there is limited number of studies which identifies the roles of teacher educators in developing critical thinking to preservice teachers. Recently studies shown that, there is a bulk of researches emphasizing the needs of critical thinking to student teachers (see [41]

Lorencova et al., 2019 for comprehensive review). Others growing number of researchers (e.g [42,43] Toy & Ok, 2012; Yang, 2012) they attempted to deeply exploring the effectiveness strategies and approaches to prepare effective teachers with high level of critical thinking skills and disposition. Despite a large number of researches, there is limited number of studies identified the roles that should be played by teacher educators in developing critical thinking in the classroom settings.

Many studies especially in professional development identified the need of teacher educators to engage or involve all learners during learning process. This involve the utilization of critical thinking in the classroom setting. For instance, Kennedy [44] found that, when trying to engage all learners and develop actively learning, there was some limitation on how to fully engage all learner. This is because the teacher educators roles or work is inherently multifaceted as noted by Kennedy [45] in his study on how professional development improve teaching. He viewed teacher educators roles as being driven with conflicting ideals and different ideas. The learning theories (eg., Brown, Bransford, & Cocking [71]) effective learning cannot occur without intellectual engagement among learners. These claims supporting the existing study on identifying teacher educators roles to making classroom engagement. Teachers should find the way of making students to think as noted by [45]. According to him, the process will help teacher to understand if the concept is well understood, where to elaborate and when to move on. Therefore, this study aimed to understand teacher educators roles in enhancing critical thinking to increase classroom engagement and involvement among all learners.

1.3 Conceptual Framework

Drawing from existing literature on critical thinking in teacher education, the simple conceptual framework were developed to understand the roles played by teacher educators as main stakeholder in enhancement of critical thinking (Fig. 1). The developed framework comprises of three parts; teacher educators, critical thinking including the roles played by teacher educators and preservice teachers. As preservice teachers as the output, the feedback will be sent back to the roles played by teacher educators for further improvement. Underlying assumption is, once teacher educators understanding their roles in developing critical thinking the results will not be limited to preservice teachers especially in the classroom setting, but will go beyond classroom boundary.

However, the roles played by teacher educators can be affected by different intervening variables including beliefs, culture, behavior and environment. According to Korthagen [46] defined beliefs as powerful in shaping who and how we act. Teacher educators beliefs can influence their roles in enhancing critical thinking. Culture are the ideas, customs, and social behaviors of particular people or society.

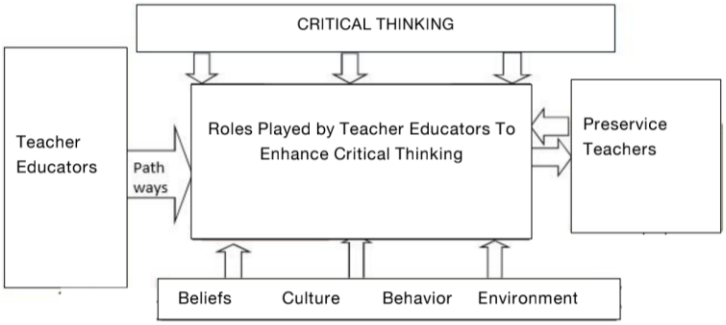

Fig. 1. Conceptual framework

The organization and teacher educators culture have great influence on their roles. Also, behavior is the way in which a person behaves in response to a particular situation and can easily influenced by motivation. Environment refers to anything teacher educator encountered outside of his/herself. Therefore, all these factors can easily affect the roles played by teacher educators in enhancing critical thinking to preservice teachers.

In the Fig. 1, the author put teacher educators in left side as initial point of the framework. The study believes that, teacher educators as main stakeholder and the urgent of change as noted by [47].Secondly, the roles played by teacher educators to enhance critical thinking; this part

link teacher educators and preservice teachers. Teachers expected to play positive roles to bring positive changes to student through development of CT. As noted by American Association for Teacher Educators (ATE) cited by (Smith [74]) developed a set of 7 standards, and standard 3 stated that: “Master teacher educators inquire into, and reflect on, their own practice and demonstrate commitment to lifelong professional development.” Therefore, identifying teacher educators roles will help them to reflect on their own practices and building their capacities through professional development. The lastly, preservice teachers who expected to possess required skills after teacher educators understanding their roles. The feedback whether successful or not, will be sent back to the roles (middle part) and teacher educators themselves for further planning for professional development.

2. METHODOLOGY

The current study adopted systematic qualitative review approach as stated by [48]. This approach allows the the author to summarize the results from the available carefully designed studies and providing high quality of evidences on the effectiveness of the problem addressed. These procedures follows the judgments about the evidences and informing the feasible recommendations. Initially, the review started to searching peer review articles published from 2000 to 2021. The searching terms used were not limited to different variations and combinations of the following key terms such as critical thinking, teaching critical thinking, thinking skills, critical thinking in teacher education, teacher educators’ critical thinking, critical thinking across curriculum and innovative way of teaching critical thinking. After this searching a total of 47 articles were obtained and those fitting to answer research questions were sorted. These process involving reading the research abstracts so as to screen the initial list of the articles. Those articles which that did not reflect the themes addressed in this study, were automatically excluded from the list.

From the total of 47 articles only 16 studies were selected from the population. However, the criteria for whether or not to include were not limited to the type of publication such as conference proceedings, peer-review, time period, language of publication, population studies and study design. Again, those which failed to meet the mentioned above criteria were removed from the list. 26% of the selected articles were from Asia, 31% were from Europe, 24% were from America, 19% were from Africa. The following table summarize the articles selected for this study.

Table 1. Summary of the articles

Author	Title	Major
Lewis et al. [49]*	How Research Contributes to Instructional Improvements?	Lesson Study,
Takahashi and McDougal [50]*	The Collaborative lesson research: Maximize the impacts of lesson study	Lesson Study
Inprasitha, Isoda [51]**	Lesson Study: Challenges in mathematics education	Lesson Study
Moon [73]***	Reflection in learning and professional development: theory and practice.	Self-Reflection
Adeyemi [14]****	Developing Critical Thinking Skills in Students: A mandate for higher education	Critical Thinking in Mathematics
Cargas, Williams & Rosenberg [2]***	An approach to teaching critical thinking across disciplines using performance tasks with a common rubric.	Critical Thinking and Creativity
Fisher [52]***	Demystifying Critical Reflection: Defining criteria for assessment	Critical Reflection
Katrina Liu [57]**	Critical reflection as a framework for transformative learning in teacher education,	Critical Reflection
Lewis et al. [49]	How Research Contributes to Instructional Improvements	Needs for Research on Critical Thinking

Moore [56]**	The critical thinking debate: how general are thinking skills?	Critical Thinking Research
Slameto [47]***	Developing Critical Thinking Skills through School Teacher Training	Critical Thinking
Stupple and Maratos [1]**	Development of the Critical Thinking Toolkit (CriTT)	Critical Thinking and Reflection
Tiruneh, Verburgh & Elen [3]***	Effectiveness of critical thinking instruction in higher education	Critical Thinking instruction
Yuan et al. [28]*	Development of a scale to measure the critical thinking disposition of medical care professionals	Thinking Disposition
Rodgers [58]****	Defining reflection: another look at John Dewey and reflective thinking	Reflective Thinking
Smith [74]**	Professional Development for Teachers educators	Teacher Educators Professional Development

*Note(s): * Asia; ** Europe; *** America and **** Africa*

3. FINDINGS AND DISCUSSION

As the study aimed to identify teacher educators' roles in developing CT during preservice teachers' preparation, the study proposed three patterns of solutions; (a) Implementing lesson study towards developing CT, (b) Emphasize critical self-reflection (c) Expanding their understanding of CT teaching through scholarly research engagement.

Implementing lesson study towards developing CT; Lesson study as the TPD approach for improving classroom instructional practices was first designed in Japan [49]. The lesson study cycles took place in the school-wide context. Lesson study teams throughout a school they build and share jointly knowledge around inquiring themes and unpack long term goals for students and testable ideas on how to reach those goals [50]. Later, the approach adopted in US, after showing effective practices in transforming classroom instructional practices through teachers content knowledge and pedagogy in Japan. Based on Inprasitha, Thinwiangthong & Loipha (2012), the successful implementation of the Lesson study in developing CT will help educators provide high-quality lessons that have a significant impact on the learners. However, for the effectively address the current study problem teacher educators should play the following cyclic roles as suggested by [50].

The first stage involves establishing LS team valued by its members and has reasonably efficient processes for learning together in developing CT. Also, the members should select area of focus and need all members to have clear knowledge about the topic. Although, in this stage, some key challenges may happen including managing time, managing participation and learning.

Secondly, this is known as the planning phase, which involves identifying learning goals for CT based on standard and current student understanding, establishing the focus of study, and building team member knowledge about it. During this phase, the team members continue to deepen their knowledge on how to develop CT by studying different studies, research, and curriculum, and understanding current student thinking. All these activities must be shown in the Teaching-Learning Plan by specifying the type of data collected. The team member can conduct a mock-up lesson which gives a chance for team members to experience the lesson from the student point of view. Although, some challenges in this stage includes; the members fail to identify the new learning that will occur during the lesson, and the planning is based on what instructor will do rather than how student will learn, think and feel.

Thirdly stage is teaching phase. At this phase, the selected research lesson is taught by one team member to their students while others observe and collect important information on how the instructor develops CT as agreed by the team members. However, some team members can choose to have two different team to teach the lesson, but the interval must be at least a day after the first teaching. Challenges associated with this phase includes; planned lesson can easily diverge from reality and leads to disappoint team members also, students thinking is not made feasible by the research lesson. During the lesson, it is very important for observers to follow some students from the

beginning to the end of the session to understand their experience.

The lastly stage, this is the final phase of reflection in which all team members seat together and reflect on their teaching, it involve post-lesson discussion and reflect on entire lesson study cycle. The team members make self evaluations on the utilization of CT techniques during the lesson study. The main challenge to this phase is; sometimes the team members may not be motivated to apply learning from lesson study to daily practice or classroom environment.

Therefore, teacher educators should strengthen their commitment to their own and other instructions by reflecting on self-determination theory and intrinsic motivation to work with other groups.

Emphasize critical self-reflection; Developing CT during teaching and learning process requires teacher educators to be well equipped and trained on the different techniques to utilize in the classroom session. Moon [73] identified that critical self-reflection helps learners step back, think about their learning experiences, and act as a catalyst for deeper and more meaningful learning. However, Liu, (2015) on his study on critical reflection on teachers' perspectives argued that the reflection that directs teachers to think about and improve student learning is itself critical reflection. Therefore, when teacher educators ask different questions like; what to teach, how to teach, and how to be effective? All these questions reflect critical self-reflection on improving student learning.

Teacher educators need to emphasize critical self-reflection as the approach in developing CT since it encourages students not only to recognize the skills they already have but also increases their abilities to become very receptive to theoretical perspectives and new ideas and enhances their abilities to critique evidence. Also Booth, (2001) argued that by engaging in effective critical self-reflection, student teachers become more sophisticated of their subject areas and more self-aware and confident learners in general.

Many studies (e.g.,. [52,53,54,55,56,58,59] Jones 2004; identified different mechanisms that can help enhance student critical self-reflection. Such as debates, the use of learning journals, peer review exercises, reflective writing, peer coaching/mentoring, student portfolios, and personal development planning. However, the evaluation of this approach on developing CT will be based on the effective engagement of the learners by critically assessing their contributions to the above-identified mechanisms.

Although many scholars identified different challenges since reflection is viewed as difficult action, preservice teachers find it very difficult to reflect over extended periods without external support [60]. Hence, without teacher educators' support through assigning different activities, critical self-reflection will not occur limits the development of CT. Also, critical self-reflection emphasizes individual engagement, so if the learners and teachers regard it as extra work, this will restrict the development of CT.

Expanding their understanding of CT teaching through scholarly research engagement; Teacher educators should be active in finding ways to develop critical thinking. This involves deepening their knowledge through engaging in research. The main objective of the research is to inform actions, gather evidence for theories, and contribute to developing knowledge in a field of study. These actions will help teacher educators find how to develop critical thinking during teaching and learning by deepening their understanding of research. Also, through classroom observations, teacher educators can realize the lack of specific techniques or training to preservice teachers (e.g., asking questions, seeking clarifications, and argument formulation). This feedback will help teacher educators to research how to develop these kinds of skills for their students.

In addition, deepening their understanding of research will help them draw lessons from cross-cultural perspectives. According to Lewis et al. [49], teacher educators' academic research help to rethink the routes from educational research to educational improvement and helps to recognize local proof routes. It also helps to build research methods and norms that will enable learning from innovative practitioners and increase the capacity to learn across cultural boundaries. Hence, teacher educators will have a greater chance to study how other countries develop CT to preservice teachers, the challenges associated with the development of CT, and how to solve those challenges. Also, it will help to bring new teaching methodologies which support or facilitate student-teacher to think critically. Therefore, through systematic research design, literature review, data collection

and analysis, teacher educators will expend their understanding about CT and develop practical insight about CT instruction in light of their research experience and results.

4. IMPLICATIONS AND CONCLUSIONS

The overarching aim of this study was to identify the roles played by teacher educators in developing CT to preservice teachers in universities.

Enlightenment with proposed solutions in addressing this problem, there is a needs for teacher educators to create conducive environment for knowledge integration. Linn et al. [61,62] on their theory of knowledge integration on general condition probed that, people should develop understanding on the complex phenomena. As the teacher educators aimed to develop new understanding on developing CT, through engaging on critical self-reflection will help them to solidify, compare and distinguishing ideas into diverse perspectives. Moreover, as critical reflection is more challenging tasks which involve ones' self stepping back and reflecting on the practices, such activity requires teachers and students invest time in deep contemplation and exploration of alternatives perspectives on the roles of teacher educators in developing CT.

Secondly, they need to develop sense of intrinsic motivation in order to attain attend goals [63]. As self-determination theory which believes that human beings have main three psychological needs; competence, autonomy and sense of belonging. Lesson study group of teacher educators that meet all these needs will be valued and possess intrinsic motivation to work together on enhancing CT to preservice teachers. Other studies [64,65]; on the theory of self-efficiency, suggested that teachers increase efficiency through participating in lesson study, they may also increase level of motivation to take the risk in trying to improve instruction through developing CT. Grossman and his colleagues on their study on pedagogues practice' identified rehearsal or micro-teaching to peers as pedagogues common to professional training. Hence, in developing CT teacher educators should conduct micro-teaching with their peers in order to experience students point of view. This will help to improve their practices in real classroom environment.

Thirdly, as they widening their understanding about CT teaching through scholarly researches, teacher educators can use meta-cognitive approaches to study critical thinking. McGuinness [66] on his study about "Meta-cognition approaches to CT, pointed out varieties of methods used to teach CT, all of which relying on meta-cognition approaches"(p. 311). The proposed approaches making students thought processes more explicitly, which enabled them to clarify complex concepts and reacting on personal thinking and gaining more self-control. Teacher educators must be aware on how to help students to learn and thinking in a very disciplined way (e.g., [67-69] Scholars proposed modeling way of thinking through scaffolding' which help students to understand, using of concepts and encouraging student teachers to recognize the strength and weaknesses of thinking processes they using. The concept identified sets of activities that teacher educator can associate to enhance CT. These associated with critically assessing through dialogue and systematic series of questions which aimed at improving students thinking abilities. For instance; student-teacher my wrote a text that "*Formative assessment should not be used as only way to evaluate students understanding*" then teacher educators can prob question through asking *why and how can we evaluate student understanding*?. This kind of question makes student-teacher to think further through providing vivid examples. Vygotsky [70] described, this approaches is potential for development intended to facilitate learners zone of proximal development in which the explained example is more critical way to develop critical thinking.

Finally, the study proposed self-study as the section in the scholarly researches and one among the roles of teacher educators in developing CT to preservice teachers. Large number of literature on self-study agreed that this approach needs to be collaborative process. This action helps teacher educators to find unified solution on how to develop CT soon after self-studying. However, scholars identified the main three challenges in implementing self-studying during development of CT; the challenge associated with self-critical nature of personal work and practices which involve individual self-critical assessment. This helps teacher educators in explorations of new techniques and correction of the past mistakes and formulating new understanding of the particular phenomena. Secondly, the stated requirement to measure the quality, this involve the methodologies that will be employed in assessment and evaluation. As teacher educators engaging in deep self-studying, the

tools for assessment on the effectiveness of the employed approach should be identified early. Thus, for self-studying the tools for assessment are not identified which make the evaluation process complicated. Thirdly, involve the tension in between the efficiency and ones' understanding. The personal ability or beliefs and one's understanding can limit the successful of self-studying. Therefore, teacher educators must take into considerations these challenges which limiting the free implementation of their roles during enhancement of CT to preservice teachers.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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