Developing Critical Thinking through Problem-Based Learning: an Action Research for a Class of Media Literacy

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DEVELOPING CRITICAL THINKING THROUGH PROBLEM-BASED LEARNING
An Action Research for a Class of Media Literacy

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by

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Developing Critical Thinking through Problem-Based Learning: An Action Research for a Class of Media Literacy

Dai-Ling Chen

Abstract

Higher education provides students with the platform for mobilising knowledge for practical use in the face of unforeseen situations. Referring to the area of media literacy, students nowadays are more likely to have access to a variety of information and publish their ideas; cultivating media literacy quality and skills thus takes on heightened significance. This requires critical thinking which encompasses knowledge and capabilities for achieving understanding, making appropriate judgement, and taking meaningful action, as well as a pedagogical approach to activating learning. The literature suggests that constructivist problem-based learning (PBL) has the potential for enhancing critical thinking theoretically; empirically, studies in different disciplines argue for the importance of strategic implementation and supportive facilitation. This study defined critical thinking as a threshold concept and established the epistemological threshold framework with conceptual and practical levels to investigate how PBL contributed to the development of critical thinking in the news media literacy class through students' learning experiences, academic performance, and perceptions of their development. Thirty-five Taiwanese undergraduates from an Applied English Department in Southern Taiwan participated in this research. Classroom action research was conducted with multiple methods including focus group interviews, questionnaires, and the teacher's observations, together with assessments of students' academic group work and individual writing tasks through the PBL process. It was found that the learning journey was explicitly transformative and troublesome, while the integrative, bounded and irreversible characteristics of a threshold concept emerged during the research process. The dynamics of peer and teacher-student collaborative work also suggested students' and the teacher's epistemological, practical, and ontological development associated with the cognitive, affective, and social aspects of learning. The data from this study were combined with existing research relating to critical thinking and the pedagogical implications of PBL to develop a reflexive framework for future practice.

Keywords: Critical Thinking Development, Problem-Based Learning, News Media Literacy, Threshold Concept, Capabilities, Transformative Learning and Teaching

Declaration

This thesis is based on my own research and has not previously been submitted for a degree in this or any other university.

Statement of Copyright

Dedication

For my mom, Bi-Lian and dad, Jing-Hai for their unconditional love and encouragement. Also for my husband, Ming Teng for his support and my lovely children, Kuan and Faye.

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Chapter 1 Introduction

1.1.Reasons for the Study

‘Depend upon it there comes a time when for every addition of knowledge you forget something that you knew before. It is of the highest importance, therefore, not to have useless facts elbowing out the useful ones.’

(Conan Doyle, 1966, p. 12, *A Study in Scarlet*)

The detective hero— Sherlock Holmes created by Conan Doyle perceived knowledge as a transformative process of discarding old thinking, selecting useful facts, and making judgements. He exhibited the critical capabilities of ‘mobilising knowledge for structuring perceived scenes’ for crime-solving (André & Fernand, 2008, p.111). With a distinct emphasis, this study in the higher educational classroom context argues for the importance of critical thinking requiring knowledge leading to capabilities of considering varieties, analysing, evaluating, and integrating ideas for new meaning-making and thus focuses on mobilising knowledge for practical use. A range of research has suggested that critical thinking is of significance in the evolvement of education (Barnett, 1997; Halx & Reybold, 2005; Johnston, Mitchell, Myles, & Ford, 2011; Kuhn, 1999; Lipman, 2003; Siegel, 1988). At the macro level, critical thinking reflects the aim of education; at the micro level, critical thinking plays the integral role in this media literacy context focusing on journalism which entails the capacity for deconstructing news media messages and linking the knowing and wider context for reflection. This study underlines critical thinking as a threshold concept ‘opening up a new and previously inaccessible way of thinking about something’ (Meyer & Land, 2003a, p. 412) giving rise to the productive capacity requisite for achieving understanding and meaning construction and therefore set out to investigate students’ journey of developing critical thinking through problem-based learning (PBL) in the news media literacy class by employing action research with multiple methods to probe their learning experiences, shift in thinking, and the development of the teacher’s facilitation.

A critical thinking framework with levels of transitions as crossroads (Barber, King, & Baxter Magolda, 2013) based on Baxter Magolda's (1992) four-stage epistemological reflection model and Moon's (2008) critical thinking representations was built from a holistic perspective encompassing the philosophical, psychological, and sociological traditions and four approaches of the logic, competence, developmental shifts, and contextual influence. This critical thinking framework is illuminated by Meyer, Land, and Davis's (2008) four modes of variation in understanding threshold concepts at the conceptual level and Baillie, Bowden, and Meyer's (2013) threshold capabilities integrating understanding, judgement-making, and skills at the practical level. The two layers embedded in critical thinking enabled the concept to be measurable and exercised in novel situations. Critical thinking as a threshold concept is inclined to be generic, while critical thinking capabilities can be manifested in particular disciplines with specific focuses. The development of critical thinking to higher-order stages of quality may bring about new prospect of knowledge (Meyer & Land, 2003b), eliciting sophisticated dispositions like creativity. In characterisation, critical thinking signifies 5Cs— change (a process of movement), contestedness (involvement of different perspectives), convergence (integration of various notions), contextualisation (context sensitivity), and challenge (unceasing enquiry). In order to help students to pass through the threshold, PBL as a constructivist pedagogical approach highlighting the problem-solving approach was employed with the knowing-reflecting-stretching ongoing spirals referring to the capacity for stretching out to integrating different disciplinary areas based on the degrees of understanding of critical thinking and reflection. Considering variations in learning, the teacher-as-researcher adopted tight to loose facilitation with the cyclic scaffold model involving the teacher's scaffolding, students' proposing and developing, collaborative evaluating, and presenting. The demand from the acquisition of knowledge and competence generates disjunction and promotes transformation for students and the teacher in the contested spaces of identity, knowledge, and power (Savin-Baden, 2006). Participants in the nurtured teaching-learning environment were thence expected to experience epistemological, practical, and ontological development in response to Barnett and

Coate's (2011) advocacy of knowledge, ability, and identity educational spaces.

With the fundamental belief that the core of media literacy is critical thinking which might be attained through PBL, this chapter outlines the background of media literacy in the Taiwanese higher education context, research methods and questions, the critical thinking epistemological threshold framework, and the pedagogy. The organisation of this study is then introduced.

1.2 Taiwan's Higher Education Context

Taiwan's higher education has faced the unprecedented challenge of low birth rate[1] and global competitiveness since the massive expansion in the 1990's for equality of access and strengthening economy. On the island of 36,000 square kilometres with a population of 23 million[2], in the academic year of 2013, there were 161 higher education institutions (TMOE, 2014a). Against this background, higher education enrolment rate in the academic years of 2011, 2012, and 2013 fell from 83.4%, 83.1%, to 79.8% (TMOE, 2014b). Confronted by the pressure of sustainability in the 'gradually-contracted' universal higher education, the government has strived to improve the teaching and research quality and increase higher education reputations, for which the Ministry of Education (TMOE) highlights 'training highly-skilled people aligned with industry needs' and 'encouraging domestic universities to adopt international practices' as higher education objectives for 2015 (TMOE, 2014c). Under the objective of enhancing the national development and international competitiveness, universities and colleges are given the free space of developing strategies and distinct characteristics to recruit students. Referring to the curricular innovation related to this study, teachers are encouraged to exert their professionalism to involve students' variations, teaching strategies and learning reflections for the vision of 'cultivating excellent and creative people' to deal with the internationalised and

[1] According to the *Demographic Yearbook and Internet data* from the United Nations, the crude birth rate in Taiwan was 8.5% in 2011, just higher than that in Japan (8.3%) and that in Germany (8.1%) (Taiwan Ministry of Interior).
[2] This information is from Taiwan Tourism Bureau, Ministry of Transportation and Communications (TTB, 2015).

diversified environment (TMOE, 2013). Bearing their autonomy guaranteed on the basis of the *University Act* (TMOE, 2011), higher education institutions have therefore implemented corresponding curricula among which PBL has been conducted in different disciplines to fill the gap between what is learned in knowledge and what can be applied in skills, realistically, in the hope of reinforcing their 'survival' under the policy. Curriculum as such brings into view issues of assuring the quality of teaching practice.

The research was undertaken in a higher education Applied English Department where the elective professional course of news media and mass communications was provided for students in the third year of study in order to develop their multi-media and multi-cultural competence for the job market. While higher education cannot eschew the responsibility for preparing students for the future world in the utilitarian sense, much attention has been given to cultivating students' capacities on moral grounds such as fostering whole persons in the service of the social and cultural community. In pondering the essence of education as mobilising knowledge, this study has attempted to consider developing both knowing and competence despite the instrument-oriented tide of explaining higher education where 'doers' tend to be more emphasised than 'thinkers'. Doers and thinkers are not incompatible. Without good-quality thinking, doing may just fall into techniques, and actions may be nothing more than mechanical products. The curriculum stimulating thinking and action as well as reinforcing students' capacity for cross-disciplinary integration might be the resolution given that 'cultivating a highly-skilled internationally competitive workforce with multifaceted expertise' is the focus of educational objectives for 2015 in Taiwan (TMOE, 2014c). This research argues for a curriculum rooted in critical thinking in response to the development of knowing leading to productive capabilities useful for uncertain situations in life. In the news media field, legitimising critical thinking as the core of achieving sophistication raises theoretical and pragmatic concerns. This will be discussed from Taiwanese news media environment to media literacy education.

1.3 Taiwanese News Media Environment

The news media environment in Taiwan has been confronted with commercialisation and ideological influence. Despite the increasing access to the Internet, television has become another dominant medium of approaching news media in Taiwan. The penetration rate of cable television where news channels including terrestrial and satellite television broadcasting can be viewed in 2012 was 81.4%, suggesting the audience's high dependence on television (Nielsen, 2013). The advent of new technologies also leads to the convergence of media; for example, the penetration rate of the digitalisation of Cable television in Taiwan reached 76% in 2014 (National Communications Committee, 2014). Liberalisation of the mass media market in the process of democratisation has resulted in diversities of choice and competition among commercial suppliers. The five main cable/ satellite television stations— ERA, EBC, CTI, SET, and TVBS in addition to the terrestrial Formosa TV News with diverse political and financial power in the background, in particular, provide 24-hour news channels along with their online versions. Increasing viewing rating to appeal to more advertisers is bound up with their profits as the major revenues. The tension among the audience, news media, and advertisers indicate the need of news media literacy capabilities requisite for deconstructing media messages.

The gradually-moderate cross-strait relationship between mainland China and Taiwan has complicated the marketisation of news media in Taiwan at managerial and operational levels since the Chinese Nationalist Party (Kuomintang/ KMT) came into power in 2008 again. Releasing the political cordon is likely to open the opportunities for China to exert influence on Taiwanese media. Hsu (2014, pp. 517-518) claims that China's impact on Taiwanese media consists in 'economic control over media outlets', 'pressure on media proprietors', and 'embedding advertising'. These strategies aim to propagandise China's official ideology, which may jeopardise Taiwan's freedom of the press and speech (Hsu, 2014). Under these circumstances, cultivating the keen capacity for making appropriate judgement in tackling media messages appears to be of paramount importance for students as the audience.

However, the awareness of the 'imperilled' media environment cannot sufficiently illuminate the nature of media literacy, for taking media literacy as the ability to prevent audiences from being manipulated by news media implies that audiences as consumers are merely passive vessels being fed with information. Resistance to news information arising from negative criticism seems to suggest a solution, but the protectionist view tends to underestimate Taiwanese judgement-making quality accumulated from the democratic progression. Media literacy, in the broader sense, pertains to not only analysing and deconstructing but also producing and constructing. It is concerned with internalised quality rather than explicit mechanised skills. In applying in the classroom, the teacher's mission is not to teach techniques of reproducing the media but to encourage students to contemplate the voices of the self, others, and the wider world based on knowing and further put the productive thinking into meaningful action. The exploratory process requires critical thinking as the pillar.

1.4 Media Literacy Education in Taiwan

Teacher and student media literacy is the requirement for cultivating students as responsible and caring persons and developing 'multi-literacy' for citizenship through general education in higher education, as stated in the *White Paper on Education* (TMOE, 2012a, p. 11). Since the *White Paper on Media Literacy Educational Policy* was initiated in 2002 in association with the enforcement of the relevant laws like the *Cable Television Act*, education institutions at different levels have endeavoured to strengthen the content of media literacy education. Cheung (2009) indicates the paradigm shift of media education in Taiwan from inoculation to empowerment in response to the abilities of 'liberating' and 'empowerment' requisite for building 'a healthy media community' identified in the media literacy policy. There is a discrepancy, however, in execution between policy and operational levels reflected in the current context as follows:

1) The government supports media literacy education by promulgating the policy and encourages the participation of education institutions and the whole society.

2) The establishment of National Communications Committee as the authority regulating telecommunications and broadcasting services in 2006 was to supervise the media, safeguarding the audience from the influence of negative news information.
3) There is a lack of influential 'healthy media communication channels' for citizens to learn and exchange ideas. The online citizen journalism platform in Taiwan Public Television Service provides the opportunity for people to produce their reports, but the connection between the production and media literacy was not explicit.
4) The foundation of Taiwan Media Watch (TMW) as a non-profit organisation with members from academia and media industry in 1999 endeavoured to monitor messaging and promote media literacy education (TMW, 2014). In an attempt to raise public critical awareness about media literacy, the TMW has attempted to include voices from more civic groups.
5) Higher education institutions tend to include media literacy in compulsory general education viewed as 'peripheral' curriculum by students compared with major academic subjects. The availability of the media literacy curriculum tends to be confined to media-related departments or institutions. This tendency contradicts the statement about media literacy as 'the second curriculum' in the policy although more institutions have provided this curriculum for students.

In Taiwan's higher education, it is not uncommon to categorise media literacy as a standalone subject in general education rather than incorporate in various disciplines, but in keeping up with the fast-changing twenty-first century, this categorisation appears to be parochial. The efforts to promote media literacy education at policy level can be feasible if they are grounded on the premise of clarifying what meaning media literacy carries and how it might be approached.

The cultivation of critical thinking is one of the missions of media literacy education in Taiwan (TMOE, 2012b); nonetheless, how critical thinking and media literacy are connected is insufficiently addressed in the policy. Bringing clarity to definition, some authors like Silverblatt (2001) and Moses (2008) draw a parallel

between media literacy and critical thinking skills. Potter (2014) regards the three building blocks of media literacy as personal locus, knowledge structures, and critical skills and characterises media literacy as a multidimensional concept embracing cognitive, emotional, aesthetic, and moral dimensions and a continuum involving degrees. Jolls (2012) advocates the systematic application of critical thinking and higher order thinking skills in media literacy based on the process of enquiry and consistent habits of mind. As knowledge is constructed and sensitive to context, Buckingham (2003, p. 38) regards media literacy as 'a form of critical literacy which involves analysis, evaluation and critical reflection' including the ability to interpret media and understand the broader context. His view deliberates the significant mental activity of critical thinking and resonates with PBL as a pedagogical approach derived from students' experiences and ongoing negotiation between the teacher and students in relation to cognitive, affective, and social dimensions of learning.

Applying literacy as the ability of reading and writing to the media terrain implies understanding and creativity rather than acceptance and reproduction in the superficial sense. Critical thinking supports media literacy in the way of adequate judgement-making, reasoning skills, reflection and contextual knowing; it is rooted in media literacy and interplays with each of the four key concepts of media literacy— production, languages, representations, and audiences which elicit related questions for enquiry (Buckingham, 2003). As the ability to read and write news as a particular type of media literacy is inherently connected with various areas, the productive capacity for knowledge integration and construction hinges on fostering the internalised quality.

1.5 Research Questions

Given this changing climate, a research study was developed which aimed to cultivate higher education students' critical thinking and professional skills through PBL concerning students' variations. The teacher-researcher conducted this study out of her working experiences in the news television broadcasting field and higher education institutions to investigate how PBL contributed to the

attainment of critical thinking in media literacy and students' transformation in thinking. Bearing the ideal of educating students as critical thinkers and doers in mind, the teacher attempted to explore the following three main questions by employing action research. Under the first two questions, there are two sub-questions respectively for specificity.

1. How did the students experience their learning of critical thinking in media literacy in the PBL process?
    1.1. In what ways did they think PBL contributed to their development of critical thinking?
    1.2. What did they consider to be the difficulties and problems in learning?
2. How did students' critical thinking shift?
    2.1. What, if any transformation occurred in students' academic performance?
    2.2. How did their understanding of critical thinking and critical thinking capabilities in media literacy develop?
3. How did PBL relate to the development of the teacher' facilitation of developing critical thinking?

Concerning the completeness of curricular packages, action research with two cycles was conducted in the 18-week media literacy class involving 35 Taiwanese undergraduate students from the Applied English Department of a Southern Taiwanese university from February to June, 2012. At the beginning of the course, students were asked pre-class questions about how they perceived the influence of the current news media, their impression of the news in Taiwan, and the topics they were interested in investigating to orient the curricular content. Two themes of *news media and propaganda* and *news media and views of the world* were studied in the first cycle before the midterm and the second cycle after the midterm. The researcher provided a range of topics for students to explore under these two themes and collected data from focus group interviews, pre-class and post-class questionnaires, and the teacher's observations, along with students' academic group work and individual writing, the teacher's and students' weekly journals for

reflection in the PBL process.

Answering the first question, the researcher used qualitative content analysis (Schreier, 2012) to investigate students' responses in two focus group interviews at the end of the first and second cycles with their reflection on learning written in journals, in the hope of eliciting their deep thinking. In answering the second question, this study drew on data from students' academic performance and questionnaires and analysed through SPSS (Statistical Package for Social Sciences) for descriptive and inferential statistics (Cohen, Manion, & Morrison, 2007) as well as the teacher's observations in field notes. The answer to the last reflexive research question synthesised related dimensions of responses to the first two research questions and further provided pedagogical reflection on the teaching and learning journey.

1.6 The Theoretical Framework

The purpose of this study was to develop students' critical thinking and explore how PBL facilitated this development. The curricular implementation was therefore empirical to meet the intention of instruction and assessment. The researcher believed the teaching and learning journey to be transformative and was interested in probing how the PBL pedagogical approach could yield understanding and integration of knowledge in new areas and how students experienced the transformation. In consideration of the specific context, this study built the two-way critical thinking framework embracing the conceptual and practical levels based on Baxter Magolda's (1992) epistemological reflection model with four stages from absolute, transitional, independent, to contextual knowing integrating different perspectives, along with Moon's (2008) elaboration of how critical thinking is manifested, including clear questioning, recognising and examining context, and deep reflection. Meyer et al.'s (2008, p. 68) modes of variation in approaching threshold concepts with subliminal, preliminal, liminal, and postliminal stages from tacit understanding to 'a new conceptual space' and Baillie et al.'s (2013, p. 236) threshold capabilities which are 'threshold to professional learning' embody the framework with levels of transitions to cross in the way of

linking the concept, capabilities, and the quality of teaching and learning within particular disciplines (Figure 1.1).

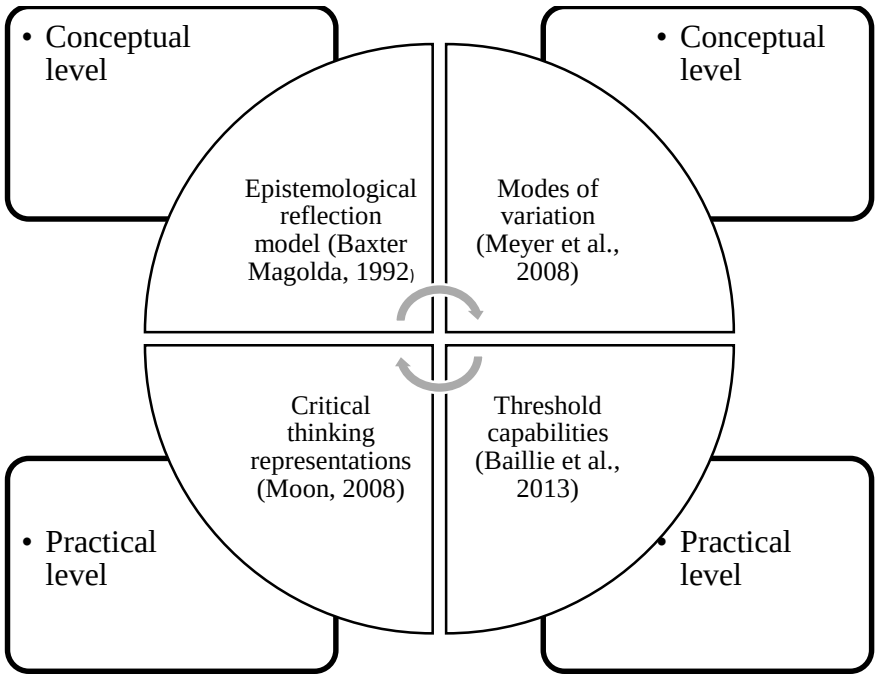

Figure 1. 1 The two-way critical thinking epistemological threshold framework

Considerable philosophical debate has attempted to conceptualise critical thinking connected with rationality and reasoning and build an extension to the aims of education (Bailin, 1996). This study deemed the philosophical tradition the underpinning theoretical base and incorporated standpoints from psychology and sociology to construct the defining statements. Integrating the philosophical, psychological, and sociological traditions, the research began the literature review from key figures including Dewey (1910), Bloom (1956), and Vygotsky (1978), to discuss the subordinate camps of the logic, competence, developmental shifts, and contextual influence in which authors held distinct but overlapping ideas. The complexity showed that a holistic critical thinking framework which could be applied in various disciplines with particular emphases was of necessity. From these literatures reviewed, reflection on the epistemological development, contextualisation of critical thinking in media literacy, and learning crossroads (Barber et al., 2013) form the essential elements of critical thinking pedagogy appropriate for the given context. Critical thinking in this research is then regarded

as a purposeful theoretical concept that requires a repertoire of productive competencies for making appropriate judgements. This study established the critical thinking epistemological threshold framework for the purpose of investigating the transformative journey of developing critical thinking as a threshold concept for the following reasons:

1) Baxter Magolda's (1992) model from the developmental-constructivist perspective echoes the holistic view of explaining critical thinking, embracing essential constituents from the philosophical, psychological, and sociological perspectives with an inclination towards intellectual development with consideration of the affective and social aspects of learning.
2) Moon (2008) considers the logical value, cognitive developmental approach, metacognition to be the central activity of critical thinking linking theory and practice, and the dynamics of collaborative work.
3) Meyer et al. (2008) address variations in learning and transformation in understanding threshold concepts.
4) Baillie et al. (2013) illustrate threshold concepts by integrating Threshold Concepts Framework (Meyer & Land, 2003a) and Capability Theory by Bowden (2004) and embody the critical thinking framework at the practical level.
5) The authors' views respond to the PBL constructivist tenets in consideration of students' experiences, reflection on learning, and the interaction between the teacher and students in the media literacy classroom.
6) With the dynamic developmental stages and transitions, this framework was handy for instruction and assessment and understanding of students' knowing transformation as well as the learning experiences at the 'liminal space' (Meyer & Land, 2005, p. 377).

In practice, given the limitation of time and space, the research paid main attention to cognitive, affective, and social dimensions of learning rather than dispositions or tendencies notwithstanding their significance have been recognised (Ennis, 1993). In the course of the study, the teacher-researcher observed the students' epistemological and practical development, emotional reaction to investigative

learning, and the relationship between the teacher and students. The multiple role of the teacher as an instructor, researcher, facilitator, and assessor according to the actual learning situations suggested the relative teacher-student ontological development. The learning expedition was thus expected to be transformative, troublesome, and integrative.

1.7 Organisation of the Study

Integral to this study is critical thinking as a threshold concept which requires conceptual clarification suitable for the given macro and micro context. The researcher's belief in the equal importance of theoretical knowledge and practical competence forwarded the empirical-oriented work because the value of critical thinking required being put into practice. To this purpose, the research started from literature review consisting of critical thinking, PBL, and media literacy, followed by the methodology used for undertaking and interpretation. From Chapter 6 to Chapter 8, analyses of data resulted in findings in response to the three research questions posed in Section 1.5. The concluding chapter summarised significant results and discussed implications. This thesis then comprised nine chapters divided into three parts: Introduction (Chapter 1), Part I: Literature Review and Methodology (Chapter 2 to Chapter 5), Part II: Analyses and Findings (Chapter 6 to Chapter 8), and Part III: Conclusion (Chapter 9). The organisation of this thesis is outlined as below:

Chapter One provided the reasons for this study, the background to conducting this research, including the Taiwanese higher education context, news media environment, media literacy education, research questions and the critical thinking framework with the conceptual and practical dimensions for the undertaking. The critical thinking epistemological threshold framework was built based on Baxter Magolda's (1992) and Meyer et al.'s (2008) models at the conceptual level and Moon's (2008) and Baillie et al.'s (2013) frameworks at the practical level. This framework was used for the purpose of measurement.

Part I: Chapter Two reviewing the concept of critical thinking variously conceptualised established the foundation of this research. This concept needed to be clarified because the definition determined what and how it was to be instructed and assessed. Bearing in mind that the theoretical basis was not the preliminary but essential phase of conducting research, the researcher studied a range of literatures on critical thinking given prominence by different authors and identified their distinctively varied but related views. Three academic traditions— philosophy, psychology, and sociology with four approaches— logic, competence, developmental shifts, and contextual influence were discussed to identify essential elements of critical thinking and construct the working definition. The critical thinking epistemological threshold framework was established with conceptual and practical dimensions for instruction and assessment and laid the foundation for designing the pedagogy.

Chapter Three defined PBL as a constructivist pedagogical approach aiming at developing critical thinking as an enquiry process. The PBL knowing-reflecting-stretching framework was formulated to help students to pass through the learning crossroads to a higher stage. Given that the contribution of PBL to critical thinking might not be straightforward, the teacher's reflective adjustable facilitation was required. 'Reducing guidance' from tight to loose facilitation was therefore adopted in association with the strategic design of topic-problem scenarios according to the level of complexity. The study involved both the group presentations and individual writing in the assessment, together with their weekly journals on a regular basis to understand the self-directed learning process of how they tackled their own problems.

Chapter Four addressed the importance of media literacy in the context of the public's frequent exposure to the media. Distinguishing between media education and media literacy is the prerequisite for defining media literacy as quality embracing knowledge and skills. This chapter reviewed contested perspectives and argued for the definition considering the specific and broader contexts. Special emphasis was placed on critical thinking as a threshold concept and PBL as a pedagogical approach. On the basis of the critical thinking epistemological

threshold framework built in Chapter 2, the four content-oriented key concepts of media literacy— production, languages, representations, and audiences (Buckingham, 2003) interacted with critical thinking to form critical thinking capabilities rubric to assess students' demonstration of critical thinking in the classroom.

Chapter Five was concerned with the methodology of classroom action research used in this research. Provided that the teacher took the lead, the teacher was required to be critically-responsive. This research hence involved two cycles of planning, implementing, analysing, and reflecting with multiple methods including focus group interviews, questionnaires, and the teacher's observations from both the teacher's and students' perspectives to enhance validity. Action research was suitable for the PBL context where the teacher and students engaged in the collaborative work and useful for giving an insight into the classroom dynamics in spite of the criticism of lacking scientific rigidity. The setting and research procedures including data collection and analyses were explained in this chapter.

Part II: Chapters Six to Eight were structured in answer to each of the three research questions. Chapter Six focused on students' perceptions of PBL learning experiences and difficulties expressed in the two focus group interviews and journals, pertaining to students' cognitive, affective, and social aspects of learning. Chapter Seven presented the results of students' critical thinking shift, including their academic performance and perceptions of the development of critical thinking. This chapter drew on analytic data from students' academic works and questionnaires as well as the teacher's observations to sketch the learning pattern. Extracts from students' answers were drawn on for illustration. Chapter Eight emphasised the teacher's facilitation of the development of critical thinking and was thus reflective and reflexive. The teacher-researcher reviewed the processes of problem analysis, developing critical thinking capabilities in media literacy, and collaborative work to identify the significance and limitation of this study. Epistemological, practical, and ontological development for both the teacher and students became apparent in these processes. The teacher's development of knowledge, competence, and self-identity resulted in the transformative journey.

Part III: Chapter Nine stressed the rationale for this study and summarised the findings in response to the research questions from the previous chapters. The researcher discussed the pedagogical implications at theoretical, pragmatic, and methodological levels in this higher education context. A reflexive critical thinking framework based on the critical thinking epistemological threshold framework and know-reflecting-stretching framework in this research was proposed for future practice.

Students stepped into the classroom out of various expectations, bearing different experiences and knowledge. This research set out to develop their critical thinking by inducing their own meaning-making, echoing Beckton's (2009) argument that learning can be more effective, teaching can be more efficient and good practice can be more disseminated, on which educational development is based. However, education should not be a taken-for-granted issue, and innovative reforms should not fall into educational sloganeering. Instead, concrete plans and implementation need to be given sufficient attention to achieve evolving objectives in the transformative and dynamic process. With the emerging rise in 'graduate economy' (Coughlan, 2014), higher education has been regarded as the platform for knowledge mobilisation leading to capability enhancement. This study attempts to explore the possibility in the subsequent chapters.

PART I:

LITERATURE REVIEW AND METHODOLOGY

Chapter 2 Critical Thinking

2.1 Introduction

At the thought of how Sherlock Holmes tackled his crime problem-solving, one might claim he applied critical thinking because he involved enquiry, investigative observation, evidence, and judgement-making. The acquisition of critical thinking in the higher education classroom context, however, does not hinge around his use of 'unemotional logic' and pure 'scientific techniques' (Harper, 2009, p. 69). The process of developing critical thinking is unlikely to be neutral; rather, transformation accompanying emotional complexity due to learning difficulties may occur. The study considers the contested perspectives explaining critical thinking and embraces diverse but related views from different authors. Moseley et al.'s (2005) discussion of three academic traditions on thinking serves as a useful background: philosophy emphasising the theory of knowledge, psychology interested in cognitive process in relation to teaching and learning, and sociology considering the individual's thinking to be affected by social interactions. In response to the three traditions, four approaches to critical thinking through the logic, competence, developmental shifts, and contextual influence with overlapping ideas are then reviewed to construct the most appropriate definition reflecting the educational objective of mobilising knowledge for practical use. Coombs and Daniels (1991, p. 35) argue that a new definition can contribute to curricular development in that 'it gives salience to a more significant range of distinctions and relationships, it does away with dichotomies that misrepresent experience, or it systematically organises a set of concepts that were previously only loosely related.' This chapter outlines earlier notions of critical thinking from Dewey (1910) and Bloom (1956), extracting essential elements for pondering over the merits and limitations of different approaches.

Critical thinking cannot occur without the ability of self-monitoring and relating it to the wider context at a sophisticated level; therefore, metacognitive competence to understand what is known and how it is known is of importance. Concerning the integration of different perspectives and epistemological development, the research

incorporates Baxter Magolda's (1992) model of epistemological reflection and Meyer et al.'s (2008) modes of variation in understanding threshold concepts associated with Moon's (2008) critical thinking representations and Baillie et al.'s (2013) threshold capabilities framework to establish the critical thinking epistemological threshold framework for instruction and assessment. This framework consists of the conceptual and practical domains in which degrees of sophistication as layered objectives are embedded and is dynamic in classroom-based use within particular disciplines. Critical thinking as a threshold concept in this framework is hence useful for understanding students' development in the light of the teaching-learning environment.

2.2 Earlier Theories of Critical Thinking

Critical thinking can be traced back to Socrates, who claimed to ask deep questions to identify and adjust 'confused meanings', 'inadequate evidence', 'self-contradictory beliefs' and 'empty rhetoric' (The Critical Thinking Community, 2013). This view has had great influence on what constitutes critical thinking in modern works. Unrau (2008) suggests that critical thinking has progressed in moves from narrow focus on logic and argument, lack of conceptual foundation making it hard to ground critical thinking in curricula, to incorporating cognitive science for broader consideration. The progress adumbrates the need of a new wave moving towards integration. In constructing what critical thinking is, a variety of perspectives are intertwined. Two key figures' works— Dewey's thinking in education and the higher levels of Bloom's taxonomy are focused on as a starting point of characterising critical thinking.

2.2.1 Dewey's Writing about the Nature of Critical Thinking in Education

Dewey (1910, p. 5) defines thinking in its best sense as 'that which considers the basis and consequences of beliefs.' He indicates the importance of a being with the capacity for thought and urges that the business of education is to cultivate individuals' minds with enquiry and reasoning, denoting probing the causes and effects of different claims to understand knowledge construction, justify argument,

and dismiss unconvincing assumptions. The consideration for reasons of logical consequences refers to 'reflective thought' (Dewey, 1910, p. 5). The growth of thinking is regarded as a natural development where the achievement of higher types of thinking requires constant reflection, yet the process of reflective thinking is 'troublesome' owing to the ongoing enquiry involving 'judgement suspended' and 'mental unrest' (Dewey, 1910, p. 13). Mainly using a philosophical approach to thinking, he also considers the psychological problem-solving aspect based on the idea of scientific enquiry (Lipman, 2003). In the course of thinking, carrying out problem solving at high levels which are naturally logical is the end result of the transformation (Martin, 2005). Dewey (2004, p. 10) views education as a 'social function' and 'fostering process' tied to democracy. He argues that an educational institution should provide balanced environment for different groups of students encouraged to coordinate between the self and diverse social environments. His concern about the separation of experience from learning at school suggests the integration of knowledge and skills required for the practical life.

The essence of critical thinking, including logic and reasoning, scientific enquiry, and problem-solving can be built on a foundation of Dewey's works indicating that critical thinking is a purposeful process. Reflective thinking is of particular significance for thinking at high levels for new meaning-making. His philosophical pragmatism and progressive pedagogy are useful for identifying the social role of education where these aforementioned capacities can be cultivated (Dewey, 2004). He places more emphasis on the investigative process than the end product though scientific enquiry may intimate taking rigid explorative procedures to account for settled objectives. Scientific enquiry, logic and problem-solving tend to mean relatively the same thing; however, they are not synonymous with critical thinking. To accommodate teaching and learning, more perspectives must be considered.

2.2.2 Higher Levels of the Cognitive Domain— the Higher Levels of Bloom's Taxonomy: Analysis, Synthesis, and Evaluation

Bloom (1956) developed six phases from mere memory of inert knowledge, comprehension, application, analysis, synthesis, to evaluation as the taxonomy of educational objectives of the cognitive domain. In relation to the intellectual skills development, knowledge is recalling information; comprehension represents understanding meaning and interpretation of problems; application is defined as using a concept in a new situation; analysis is the ability to break down elements into constituent parts so that organisational principles and relationships between ideas are made explicit; synthesis is putting parts together to 'form a whole' (Bloom, 1956, p. 16). Evaluation refers to the judgements made for given purposes, for which all of the previous cognitive levels are required (Berger, 2011).

Bloom's taxonomy of cognitive domain can be conveniently used in teaching and assessment because it contributes to classifying degrees of intellectual behaviours sophistication of learning. Nevertheless, it is challenged because of the vagueness of higher-order thinking— analysis, synthesis, and evaluation. Ennis (1985) argues that the connection between critical thinking and higher-order thinking is evident, but the two concepts are not equivalent to each other. Employing this taxonomy as a guideline to give instructions, therefore, is not as straightforward as it appears, for the boundaries among phases can be ambiguous. For example, applying knowledge to problem-solving may involve analysing strategies and synthesising ideas. The existence of a sequential link appears to result in the ignorance of learning dynamics, for the emphasis on the cumulative hierarchy of mere cognitive skills tends to rule out the complexity of teaching and learning critical thinking. Moseley et al. (2005, p. 54) claim that his cognitive domain taxonomy does not address 'the processes of cognitive construction' and the affective and social aspects of learning, and how the three cognitive, affective, and psychomotor categories later produced in relation to knowledge, attitude, and skills are integrated in the human experience of thinking and learning is not clearly explained.

Expounding Dewey's transformative-reflective thinking and Bloom's cognitive skills development and extending them to include logic and skills in critical thinking, Facione (2011, pp. 5-7) identifies core cognitive critical thinking skills as 'interpretation, analysis, evaluation, inference, explanation, and self-regulation'. Among them, self-regulation is highlighted because it refers to the improvement in one's own thinking, requiring looking back at 'all the dimensions of critical thinking' involving re-examination, reconsideration, and changing conclusions based on realisation (Facione, 2011, p. 7). This idea is similar to metacognition meaning monitoring thinking. Critical thinking hinges on purposeful and reflective judgement-making, and a critical thinker should be characterised not only by knowledge and skills but also by dispositions like civic engagement (Facione, 2011). He explicates the early notions of critical thinking and attaches importance to the connection between critical thinking for learning and the future society. Drawing on these works, critical thinking needs in-depth scrutiny.

2.3 Four Approaches to Critical Thinking: Logic, Competence, Developmental Shifts, and Contextual Influence

Moon (2008, p. 35) offers a comprehensive review of different dimensions of critical thinking, among which the groups of 'logic', 'skills and abilities', and 'developmental approaches' are relevant to this study. For the pedagogical purpose, the discussion focuses on the literature pertinent to the philosophical, psychological, and sociological traditions in consideration of the four approaches including logic, competence, developmental shifts, and contextual influence. The research does not aim to reiterate other authors' contentions but takes a distinguishing position highlighting particular elements of selected works, integrating these views and constructing the definition for this context.

2.3.1 The Logic

Common features can be distinguished on the basis of philosophical conceptions concerned with the idea of good argument and reasoning. The fierce debate has revolved around the subject-specific and general-based values. McPeck (1981)

claims that critical thinking is a part of rationality and connected with knowledge in specific domains, yet Paul (1985) regards critical thinking as disciplined general principles. Ennis (1993) provides a comprehensive guide to assessment by considering subject-matter and general-based aspects. Siegel (1988) maintains that both specific and general values are relevant to critical thinking correlated with reasoning assessment and rationality and advocates a deeper epistemological understanding. Paul (1987, p. 281) also puts forward rational thinking and critical thinking in the strong sense promoting the discovery and contestation of 'egocentric and sociocentric tendencies'. Critical thinking for him involves deep knowing of self, and a strong critical thinker is able to consider the holistic picture instead of merely criticising a particular argument (Mason, 2008). Paul and Elder (2002) indicate the significance of the disciplined quality of thinking in any set of circumstances and argue for the application of 'universal intellectual standards' such as clarity, accuracy, relevance, and logicalness to assessing the elements of reasoning identified as 'universal structures of thought' on the ground of a general logic. Questions including whether a statement makes sense and how that follows from the evidence are raised to test logicalness of thinking (Paul & Elder, 2002). The argument makes sense with supportive evidence; by contrast, critical thinking does not occur if the opposite is the case. The sequence implies the principles of thinking for people to follow. Their contention does not explicitly highlight objective truth but tends to indicate that the ultimate true answer plays an essential part. In their latter work, they argue for the generic skills of critical thinking useful for applying in any subject to think logically (Paul & Elder, 2006).

Manifesting logic through systematic structure, though, does not seem to guarantee critical thinking. Recognising the limitations of formal deductive logic, theorists believing in informal logic concentrate on 'the interpretation, evaluation, and construction of arguments in natural language' (Bailin, 1996, p. 119). Bernstein (1995) applies informal logic to teaching critical thinking but notes the need for caution to eschew the focus on the 'fitter' argument to survive but insufficient attention to the competing one. Logic, then, contributes to providing generic or specific values of the criteria of argument and corroboration but might risk

overlooking the deeper investigation of alternatives despite Paul's (1987) consideration of multiple perspectives. The quality of argument in the light of logic is accentuated, but that leaves open the question of whether the quality of critical thinking can be ensured only by logic.

In encapsulating the above-mentioned, the application of logic tends to deal with the quality of the reasoning, and analysing the appropriateness of argument is paid much attention. The common characteristics are inclined to be normative; however, whether the norms can be extended to different disciplines has been disputable. It might be that particular settings accommodate the learning of general principles; applying the integration of critical thinking and disciplinary concepts to teaching, therefore, can be essential to determining critical fundamentals peculiar to particular fields. In this category, some related criteria such as coherence and the methodical approach to analysing and solving a problem can be highly valued. Logic-oriented standards under the philosophical tradition can be the underpinning foundation of critical thinking but are not likely to be the only elements of critical thinking due to the narrow view of the emphasis on the objective truth and argumentative process. The ultimate correct answer is not the destination of critical thinking, and complying with the procedure of argument does not necessarily lead to critical thinking; as Moon (2008) puts the point, critical thinkers need to be willing to surmount abiding by given rules.

2.3.2 Competence

Overlapping some ideas in the logic group, another strand of competence has reduplicate but distinct claims stressing essential critical thinking skills and abilities to defend decisions. Deeming critical thinking 'a skilful activity', Fisher (2001, p. 14) argues that good critical thinking meets a variety of intellectual standards concerned with the quality of thinking. The core constituents of critical thinking include skills to: 1) identify the elements in a reasoned case, 2) identify and evaluate assumptions, 3) clarify and interpret expressions and ideas, 4) judge the acceptability, 5) evaluate arguments of different kinds, 6) analyse, evaluate, produce explanations, and make decisions, 7) draw inferences, and 8) produce

arguments (Fisher, 2001, p. 8). He emphasises identifying basic skills essential to good critical thinking, leading to the practice. The use of reflective critical thinking skills in questioning, reasoning and arguing is required, according to which exercises for the development of critical thinking skills are provided.

Fisher cites Ennis's (1985, p. 45) widely-used definition of critical thinking as 'reasonable, reflective thinking that is focused on deciding what to believe or do' and underscores decision-making in definition. Contending that critical thinking should be more than McPeck's (1981, p. 7) 'reflective scepticism', Ennis (1993) develops an interdependent list of abilities and dispositions for critical thinking assessment, for example, the abilities of judging the credibility of sources, identifying conclusions, reasons, and assumptions, and the dispositions of being open-minded and well informed to cover the goals of curriculum, teaching and learning. McGregor (2007) explains that being able to clarify, decide, infer, consider, reason, and integrate to defend decisions are core abilities of critical thinking. Elder and Paul (2010, p. 38), similarly, argue for the critical thinking competency standards needed for assessing critical thinking abilities to:

- raise vital questions and problems,
- gather and assess relevant information,
- come to well-reasoned conclusions and solutions,
- think open-mindedly within alternative systems of thought, and
- communicate effectively with others in figuring out solutions to complex problems.

They regard critical thinking as a process of analysing and assessing thinking for improvement. Critical thinking, then, covers knowledge, intellectual standards for thinking, and restructuring thinking to achieve the actual ameliorating of thought (Elder & Paul, 2010). Lipman (2003, p. 56) also lists some traits indicating that critical thinking should be 'impartial, accurate, careful, truthful, abstract, coherent and practical'.

Distinguishing from Ennis' (1993, p. 180) view of critical thinking assessment which can be used for an 'entire critical thinking curriculum' and some subject-specific instructional purposes, Cottrell (2005) offers a series of steps of critical thinking in terms of generic study skills. She describes, 'Critical thinking involves working out whether we believe what we see or hear; taking steps to find out whether something is likely to be true; arguing our own case if someone doesn't believe us' (Cottrell, 2005, p. viii). She argues for the ability to identify and recognise arguments and assumptions, as well as find and evaluate sources of evidence by providing activities and assessment charts (Cottrell, 2005). Hinting at finding a final correct solution to a problem, nonetheless, may fall into criticism because as she maintains, critical thinking is a complex mental process (Cottrell, 2011), and the process appears to be difficult to be assessed through the step-by-step approach.

Viewing critical thinking as a repertoire of skills indicates that a person has to meet the criteria for good thinking, but sometimes it is not unlikely for one to be adept at performing the skills without thoughtful consideration. For teachers, teaching students specific skills appears not to reflect the spirit of critical thinking which requires making reasoned judgements rather than mere skills. Following a mechanical sequence of the process hence seems to contradict the rule-challenging nature of critical thinking. These arguments are not to negate the requirement of critical thinking skills but to stress that competences manifested need the underpinning theory and knowledge as the base, which may benefit from the philosophical academic tradition. In consideration of the learning dynamics in the classroom, the progress of attaining critical thinking skills cannot be ignored.

2.3.3 Developmental Shifts

Considering the little attention paid to the developmental dimension from educational philosophy, Kuhn (1999) argues for the relevance of cognitive development to understanding of critical thinking and recognises the importance of a developmental framework. She contends that critical thinking is tied up with metacognitive competencies, the 'second-order meta-knowing skills' revolving

around self and others' knowing (Kuhn, 1999, p. 17). Her developmental theory describes metastrategic processes as managing approaches to working with knowledge, metacognition as the recognition of knowledge and the process of knowing at the declarative level, and the epistemological aspects of knowledge as how one's knowledge adapts to the broader understanding of knowledge. On the basis of metacognitive development and epistemological understanding, Kuhn and Dean (2004, p. 272) propose the levels for the development of intellectual values from realist, absolutist, multiplist, to evaluativist valuing critical thinking as 'a vehicle that promotes sound assertions and enhances understanding'. Critical thinking skills of enquiry and argument are thus not merely performance tools but also essential abilities to develop broader meta-level structure that 'reflects understanding of how, when, and why to use them' (Kuhn & Dean, 2004, p. 273).

Scott (2008) also argues that metacognition rests on epistemological activity by drawing on Bruner's (1996, p. 148) view of metacognition which transforms 'ontological arguments' about the reality into 'epistemological ones' about how it is known, concerned with developing a reasoned idea through reflecting on one's own points of view and those of others. In relation to transformative learning, it has been widely established that metacognition is constant reflective activity in the case of 'thinking about thinking' (Smith, 2004, p. 23) or 'enabling control or self-regulation over thinking and learning processes and products' (Hartman, 1998, p. 1). Regarding learning development, Moseley et al. (2005) built the cognitive skills framework integrating strategic and reflective thinking in which metacognition and self-reflection are included. They argue that the iteration of cognitive progression is possible, whereas metacognition and self-regulation may or may not happen in the cognitive process. Their contention suggests that critical thinking is not reduced to mere cognitive skills but involves deeper metacognitive activity. In response to critical thinking, metacognitive approaches appear to have positive influence on the learning experience. Veenman, Van Hout-Wolters, and Afflerbach (2006) make a distinction between metacognitive knowledge referring to self-knowledge about learning processes at a declarative level and skills meaning the procedural knowledge for managing learning activities. Their metacognitive knowledge and

skills respond to Kuhn's (1999) metacognitive and metastrategic knowing, indicating that critical thinking needs to involve 'knowing that' as knowledge and 'knowing how' as skills. From the built, it may be useful to suggest that the epistemological continuum acts as a critical factor in achieving the depth of critical thinking since it makes the connection between theory and classroom practice (Moon, 2008). For pedagogical purposes, epistemological development as a process and individual epistemological beliefs can offer an indication of the manner in which students see knowledge. However, given the complexity of the learning environment, the developmental indication does not mean that teaching and learning follow a simple step-by-step pattern. As Perry (1985) argues in 'different worlds in the same classroom', students in the same context may perceive things differently because of various epistemological development. It implies that critical thinkers should be open to different ways of knowing.

Baxter Magolda (1992) used semi-structured interviews to undertake her five-year longitudinal study of 101 students of different genders and developed her epistemological reflection model with four developmental phases of how students perceived the nature of knowledge. Absolute knowledge means that knowledge is viewed as certain, under which two patterns of receiving knowledge and mastering knowledge are involved. Transitional knowing reflects that some knowledge is uncertain, in which the two patterns are interpersonal knowing and impersonal knowing. Independent knowing recognises that knowledge is uncertain, embracing and subordinating others' ideas. The highest stage of contextual knowing refers to contextual knowledge integrating one's own and others' ideas (Baxter Magolda, 1992). She lays emphasis on not merely students' ways of knowing but also reasoning patterns affecting 'how students think about knowing' (Baxter Magolda, 1992, p. xii), recognising the unreality of interpreting students' development collectively without the consideration of individual differences. Her model is also concerned with what students know and how they know. Although her theory is criticised because of lack of ethnic and institutional diversity and ignorance of gender developmental differences (Carney, 2002), it is a useful model for seeing critical thinking as a cognitive and affective developmental process for individual

students in the socialised dynamic environment. Unlike traditional developmental stage models where knowledge is organised in logical structures, her model considers that knowledge is structured by the learner from the constructivist perspective. Integral to her constructivist-developmental theory is self-authorship integrating epistemological, intrapersonal, and interpersonal dimensions and defined as a holistic meaning-making capacity (Baxter Magolda, 2009; Boes, Baxter Magolda, & Buckley, 2010). Baxter Magolda (1992, 2009, 2010) contends that independent judgement-making is connected with epistemological advancement cultivated within higher education where a holistic meaning-making capacity characterised by internally generating and coordinating one's beliefs is of concern (Baxter Magolda, 2010). The nature of meaning-making lies in learning movement from mere dependence on external sources, crossroads, to solely internal position (Barber et al., 2013).

2.3.4 Contextual Influence

An analogy may be drawn between Baxter Magolda's view of transformative learning and Vygotsky's (1978, pp. 56-57) conception of transformative 'internalisation of higher psychological functions' comprising the reconstruction of external activities to internal ones, an interpersonal process changed into an intrapersonal one, and 'the result of a long series of developmental events'. Vygotsky considers the mental activities of thinking to be social, for individuals' thinking is affected by various external social contexts, and learning is a matter of internalising. His approach to achieving higher levels of knowing through social interactions, such as the teacher's guidance and collaboration with more knowledgeable peers in the learning process is defined as the 'zone of proximal development', in light of which students solve problems beyond their actual developmental level and achieve independent development after the internalisation of the processes (Vygotsky, 1978). Wood (1998, p. 17) regards the social interactional process that can lead to knowledge as 'a product of the joint construction' of understanding by learners and more capable members and refers to the approach to shaping human development through social and cultural interactions as 'social constructivism'.

However, partly sharing with Vygotsky's (1978) argument about the direct linkage between mental development and the influence of sociocultural activities, Cobb, Boufi, McClain, and Whitenack (1997, p. 272) note the need for considering 'qualitative differences in individual children's thinking even as they participate in the same collective activities'. They suggest that students' variations cannot be excluded in the process of thinking reflectively through sociological construction of collective ideas. In support of the constructivist approach, Baxter Magolda (1992) sheds light on one's participation in relationships towards the convergence between teacher and student as well as knowledge and experience. Unrau (2008) views critical thinking as 'a transformative outlook framed in a social context'. He believes the transferability of enquiry learned in one domain to others through reasoned reflection once the integration of critical thinking is encouraged, and constant evolving cycles of enquiry through social interactions shape knowledge (Unrau, 2008). From the psychological perspective, Halpern (2007) also believes that instruction with diverse contexts enabling transferability of knowledge across domains enhances critical thinking. With the dynamic interaction between the contexts and individuals, however, the contexualised nature of critical thinking implies the possibility of context-specific meanings (Lipman, 2003) which might give rise to the difficulties in transferring between fields (Johnston et al., 2011).

2.4 Defining Critical Thinking in the Higher Educational Context

As discussed, critical thinking involves: 1) enquiry, 2) problem-solving, 3) judgement-making, 4) reflective thinking, 5) logical skills and abilities, 6) cognitive and affective development in the social environment, 7) epistemological progression, and 8) concern with context. These features tend to be generic and imply the adjustable application in different disciplines with particular distinct emphases. They denote that the attainment of critical thinking is a transformative process along with increasing sophistication. As the learning environment in higher education is complex and knowledge is contestable, critical thinking is concerned with the integration of contested views and epistemological development. This study thence draws attention to the pith of critical thinking characterised as 5Cs—change (a process of movement), contestedness (involvement of different

perspectives), convergence (integration of various notions), contextualisation (context sensitivity), and challenge (unceasing enquiry).

Accepting that knowledge is structured by learners, this study employed Baxter Magolda's (1992) epistemological reflection model in which knowing and reasoning are rooted to form the basis of defining critical thinking for the following reasons:

1) It integrates the philosophical perspective of reasoning, the psychological perspective of cognitive development, and the sociological perspective of the social effects on the individual's thinking.
2) It is different from the mechanical view of progression but values students' expression of ideas and notices the evolving teacher-student relationship emerging in the process, referring to a dynamic paradigm involving the cognitive, affective, and social dimensions.
3) It highlights students' epistemological development from dependence on external resources, crossroads, to internal independent voice, reflecting the transformative nature of learning.
4) It provides a simpler means of understanding the manner where students see knowledge.
5) With the four stages and their illustrations, it is handy for the pedagogical purposes of instruction and assessment for group development and individual variations.

A working definition of critical thinking suitable for this study context is accordingly presented as below:

1) an idea of internalised quality encompassing knowledge, competence, and a context-sensitive capacity in response to the changing educational environment.
2) a concept in parallel with the epistemological development, reflecting the shift from absolute knowledge to contextual knowing;
3) a practical capacity to work with complex ideas, requiring in-depth justification

of a judgement, the ability to expand one's background knowledge and beliefs to consider alternatives, integrate ideas, and construct meaning for problem-solving;

4) a productive activity which involves cognitive and affective progression in a socially-nurturing environment;
5) a purposeful learning process with layered objectives in which knowledge is formed and related to its context;
6) a notion tied to reflective thinking and metacognition.

2.4.1 The Critical Thinking Framework

The researcher adapted extended meanings in line with the four stages of Baxter Magolda's model to establish the principles suitable for measuring students' attainment of critical thinking. They are:

1) Absolute knowing: at the stage of acceptance— accepting what is informed without critically considering the background or evidence. Argument against others' is based on personal bias which usually falls into negative criticism without justification.
2) Transitional knowing: at the stage of awareness— recognising what they know and consider how they know it. Students acknowledge that not all statements are out of question. By expressing their knowing, they also consider the strategies they use. However, they are unable to integrate different ideas due to lack of background and disciplinary knowledge.
3) Independent knowledge: at the stage of clarification— distinguishing their own knowing from others' by drawing on reasoned argument and evidence. Students are able to consider and probably integrate different perspectives on interpreting one thing with adequate justification. They also recognise that one's belief can be affected by one's experience and the wider environment on which others' values rely.
4) Contextual knowledge: at the stage of evaluation— deeply reflecting on their knowing in the frame of reference or context. Students are able to evaluate different perspectives by referring to sufficient and appropriate evidence. The

capacity for integrating various perspectives for new meaning-making is manifested with regard to multiple aspects of the wider environment. They can also question the limitations of their own thinking and deliberate through reasoned justification.

The classroom research requires putting the concept into practice. Influenced by Baxter Magolda's (1992) epistemological reflection model and King and Kitchener's (1994) 'reflective judgement' meaning examining relevant information to construct plausible solution for an ill-structured problem, Moon (2008, pp. 198-201) develops a 'framework for critical thinking representations' including description with little evidence, descriptive text moving towards critical thinking, and two higher phases of critical thinking for practical use in the classroom. The critical thinking representations point to the capacity to justify 'a reasonable judgement' which relies on 'an understanding of knowledge as constructed' (Moon, 2008, p. 126), useful for assessing students' manifestation of abilities in response to absolute, transitional, independent, to contextual knowing and was thus adapted as the practical part of the evaluation rubric. Critical thinking capabilities expected to be demonstrated, according to Moon (2008, pp. 199-201), are:

1) Clear questioning of ideas and assumptions: Mulling over obvious ideas and examining assumptions are essential. Self-questioning and possibly self-challenge is evident.
2) Recognition of a historical or social context that may be influential on the response to the task: Multiple perspectives are recognised and considered.
3) An introduction of the issue, an examination of the wording or context of it: Reinterpretation may be involved for clear analysis. The context, purpose for or limitations of the current thinking may be mentioned. The selection of the evidence for examination is appropriate and sufficiently wide-ranging.
4) Deep reflection: It incorporates the recognition that the frame of reference or context within which the issue is viewed, could change and affect the conclusion.

As Figure 2.1 presents, this two-way framework consists of the conceptual and practical levels and enables the abstract concept to be measurable in the form of critical thinking capabilities. The understanding of the concept leads to capabilities subject to epistemological development; with increasing sophistication, new knowledge is likely to be constructed. The development is ongoing but not in a linear pattern.

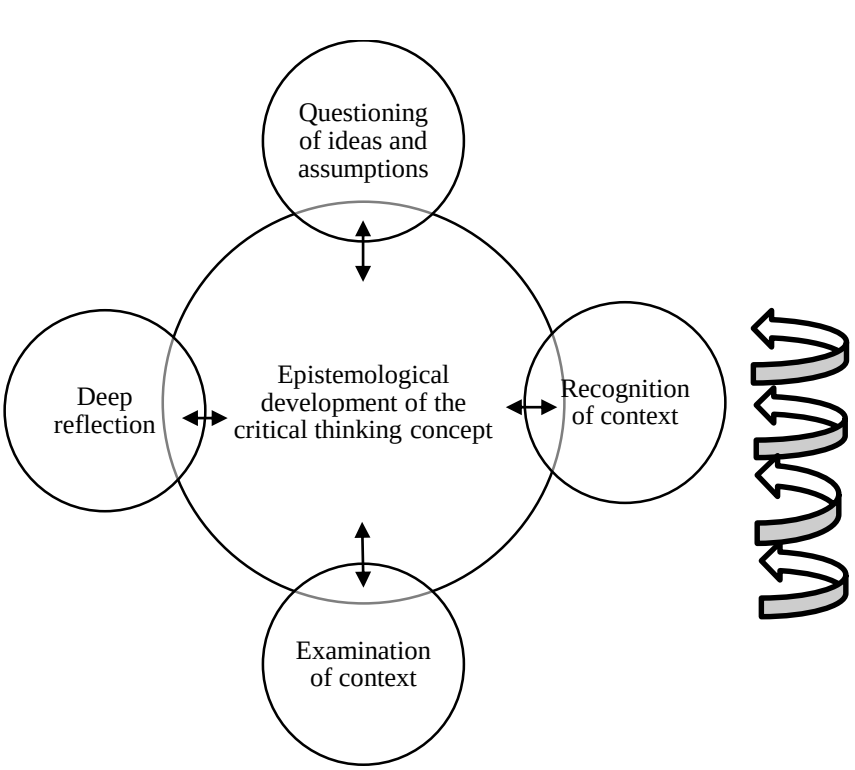

Figure 2. 1 The two-way critical thinking framework

In transformative learning, students may experience epistemological, practical, and ontological development, on the strength of which Barnett and Coate (2011) recommend the educational spaces in curriculum design in parallel with the levels of students' knowledge, capabilities, and the development of critical being. The established critical thinking framework gives weight to individual students' understanding of knowledge and capabilities from naivety to sophistication and is thus generic-oriented. The intriguing question arising out of the developmental framework is how students can move from one lower stage to another higher one

in particular contexts. The idea of a threshold concept and the emergent frameworks thereof appear to pave the way for closely linking a concept, capabilities, and the quality of teaching and learning within disciplines.

2.5 Threshold Concepts and Transformation in Learning

Considering a threshold concept as 'akin to a portal, opening up a new and previously inaccessible way of thinking about something', Meyer and Land (2003a, p. 412) describe a threshold concept sharing particular relevance to critical thinking defined in this study from the developmental perspective because 'it represents a transformed way of understanding, or interpreting, or viewing something without which the learner cannot progress.' They contend that understanding a threshold concept may give rise to 'a transformed internal view of subject matter, subject landscape, or even world view' (Meyer & Land, 2003a, p. 412). Threshold concepts described as 'conceptual gateways' (Land, Meyer, & Smith, 2008, p. x) are by nature transformative, and the grasp of a threshold concept thus points to a change of quality rather than an improvement in mere techniques. Accompanying consequences may arise from crossing the portal, indicating a threshold concept is transformative, integrative, irreversible, troublesome, and bounded, in Land et al.'s (2008) defining features. In addition to achieving new understandings in the learning process, students may be able to integrate related areas of study and not easily to revert to the naïve state. Encountering new knowledge, nevertheless, is not expected to be straightforward but demanding, and moving between conceptual boundaries in different disciplines seems to be restrained. On the way to breaking through a threshold, students are faced with new challenges and enquiries to be discovered, likely to cause emotional reactions such as worry or anxiety.

The anxious suspense sometimes denotes that students arrive at the 'stuck place' where they struggle between 'understanding and troubled misunderstanding or limited understanding', referred to as 'liminal space' between states towards the portal in the transformative journey (Meyer & Land, 2005, p. 377). Cousin (2006) indicates that this troublesome excursion involves cognitive and affective issues

hardly removed from the social context. The real learning situations, though, may reveal a great diversity of responses from individual students experiencing the transition. Learning difficulties may scramble some students' minds, whereas others may be able to scale the wall in front of the threshold. Timmermans (2010) argues that this situation happens probably because a threshold concept is at a distance from where students can achieve and also highlights the cognitive and affective processes of transformation. Meyer et al. (2008) interpret theories of variation through the lens of threshold concepts and stress the impact of social environments on learning. The threshold concepts framework, then, gives variation within learning particular attention and might best work with a model comprising conceptual and empirical dimensions concerned with learning complexity in this defined context. This signifies the occurrence of epistemic shift with a well-nurtured teaching-learning mode. Entwistle (2008, p. 32) elaborates that transformative thresholds open up the subject 'through integrating other, lower-level concepts', and pondering teaching and learning based on variation is a threshold concept per se.

2.5.1 Critical Thinking Epistemological Threshold Framework

During the learning journey, the essential features of threshold concepts are inclined to respond to the characteristics of critical thinking referring to change, contestedness, convergence, contextualisation, and challenge (argued in Section 2.4) at the conceptual level. However, studying the tension between concepts and abilities, Rowbottom (2007, p. 263) raises a question pertaining to this empirical research: 'how is it possible to test for concepts, rather than abilities?' As the established critical thinking framework comprises the conceptual and practical levels, researchers studying threshold concepts have also endeavoured to build frameworks addressing the connection between concepts and abilities within different domains. In mobilising knowledge attained from formal study for rich meaning-making, Perkins (2008, p. 13) advocates proactive knowledge for broad use beyond classroom settings and argues that threshold concepts contribute to fostering 'the ability to apply the knowledge with understanding and engagement'. He sets up an ideal goal of integrating knowledge and ability, but the road to this

end can be rugged and rough. Meyer et al. (2008) propose modes of variation serving as a useful background of understanding the conceptual development. Subliminal mode refers to variation in students' tacit understanding, representing a 'natural way of thinking'; preliminal mode means variation in how the threshold concept 'initially comes into view'; liminal mode reflects variation in how students make sense of the threshold concept towards the integration of different perspectives, and postliminal mode is variation in how students perceive the epistemological and ontological shift in 'exiting into a new conceptual space' (Meyer et al., 2008 p. 68). Variation, in this sense, is 'the extent or degree to which individuals vary in performance and understanding' and 'viewed from the perspective of individual differences' (Land & Meyer, 2010, p. 64). These modes contribute to explaining students' varying development in contextualising learning material from a constructivist perspective and hence offer the means of capturing students' understanding in respect to a particular subject area (Scheja & Pettersson, 2010). Variation theories are also incorporated in Baillie et al.'s (2013) Threshold Capability Integrated Theoretical Framework (TCITF) melding the threshold concepts framework and capability theory by Bowden (2004) together. They argue for the integration of 'episteme— the way of understanding', 'phronesis— value judgements and decision making', and 'techne— technical skills' to strengthen students' transformative and capability learning experiences (Baillie et al., 2013, p. 228). This framework concretises threshold concepts through the journey from engagement with concepts, capabilities development, to the achievement of capability knowledge to cope with unforeseen situations. 'Experience of variation', 'reflection', and 'direct learning' are of particular importance for students to make sense of their capability progression (Baillie et al., 2013, p. 242). Four modes of variation and the TCITF appear to fit in with the two-way critical thinking framework built in Section 2.4.1, for they address the development at the conceptual and practical levels in relation to the epistemological, practical, and ontological development. The integration of these frameworks, then, reformulates a more powerful rubric for the purpose of research and pedagogy and the indication for students to improve their understanding in the defined class of study (Table 2.1).

Table 2. 1 The critical thinking epistemological threshold framework

Criteria/ Marks	Epistemological reflective stages (Baxter Magolda, 1992)	Modes of variation (Meyer et al., 2008)	Critical thinking capabilities (Moon, 2008)	Threshold Capabilities (Baillie et al., 2013)
Excellent/ Group: above 80 Individual: above 90 (External dependence< internal independence)	Contextual knowing: Knowledge is contextual./ evaluation: deeply reflecting on knowing in the frame of reference or context	Postliminal mode variation in how students perceive the epistemological and ontological shift in 'exiting into a new conceptual space'	Clear questioning of ideas and assumptions/ multiple perspectives taken account of/ appropriate examination and selection of the evidence/ deep reflection and the recognition of the impact of different frames of reference on the conclusion	Sophisticated ways of understanding/ judgement-making/ proficient skills
Transitional crossroads level 3				
Good/ Group: 70-79 Individual: 80-89 (External dependence< internal independence)	Independent knowing: Knowledge is uncertain./ clarification: distinguishing self-knowing from others' and considering different perspectives on interpreting one thing	Liminal mode variation in how students make sense of the threshold concept towards the integration of different perspectives	Appropriate questioning of ideas and assumptions/ views likely to change with time or the emotional state/ the wording explored for eliciting deeper meaning / the material subjected to reflection and consideration	Adequate ways of understanding/ judgement-making/ competent skills
Transitional crossroads level 2 (External dependence ≒ internal independence)				
Satisfactory/ Group: 60-69 Individual: 70-79 (External dependence > internal independence)	Transitional knowing: Knowledge is partly certain./ awareness: recognising what is known and considering how it is known	Preliminal mode variation in how the threshold concept 'initially comes into view'	Assumptions for analysis not explored in depth/ comparisons made between ideas no more than two ideas at a time/ structuring towards the reaching of some sort of conclusion/ some drawing in of additional ideas	Developing ways of understanding/ judgement-making/ developing skills
Transitional crossroads level 1				
Poor/ Group: below 60 Individual: below 70 (External dependence > internal independence)	Absolute knowledge: Knowledge is certain./ acceptance: accepting what is informed without critically considering the background	Subliminal mode variation in students' tacit understanding	Little questioning and assumptions unexamined/ a narrative account from one point of view/ no overall structure and focus/ external information not considered in depth	Naïve ways of understanding/ judgement-making/ insufficient skills

Despite that the TCITF is not explicitly concerned with the relationship between individual students and the social context (Baillie et al., 2013), in synthesising theories from Baxter Magolda (1992) and Meyer et al. (2008) at the conceptual level, as well as Moon (2008) and Baillie et al. (2013) at the practical level, this epistemological threshold framework reflects the tendency of individual development with detailed elaboration rather than rigid regulations, for the epistemological progression is unlikely to be as linear as a step-by-step pattern. The oscillatory nature of learning indicating a series of moving back and forth in development has been widely recognised (Land et al., 2008; Land, Meyer, & Baillie, 2010; Meyer & Land, 2005; Moon, 2008). At the two lower stages, students may rely more on extrinsic information; that is, external dependence is more influential than their internal independent voices. Their understanding of critical thinking may thus remain fragmented. At the two higher stages, by contrast, students' internal independence outweighs the external influence. Actual engagement with critical thinking occurs after they enter the independent-liminal stage where they are capable of clarifying different stances, integrating ideas, and making their meaning. The most sophisticated stage entails a deep understanding of knowledge, self, and the wider context in new ways. The movement from low to high thinking stages implies the developing abilities to consider, select, evaluate, and integrate for new meaning construction and thus proceeds from discarding old assumptions to embracing new ideas of creativity, from passive to active learners. This does not mean, though, that the epistemological and ontological development does not take place at the lower stages; rather, the transformation in the higher stages brings about a distinguishable brand new vision of seeing knowing, being, and the world.

The consideration of this study on the epistemological development based on the threshold framework was undertaken to investigate how critical thinking as a threshold concept might lead to the transformations in students' learning experiences and understanding of critical thinking. For this research purpose, the transformative and troublesome properties were targeted, while the other three features emerged during the process. In depicting the difficulties students may

experience at the learning junctures, Baxter Magolda (2009) concerns the discomfort of the crossroads due to the need for the construction of meaning and immaturity of forming internal criteria. As the actual learning development is not expected to be as neat as what the four stages present, ‘conceptual grey areas’ as transitional crossroads exist at the junctions of stages where students may be locked in seesaw struggles, and the influence of external dependence and that of internal independence might be close to each other in the middle of the journey. Students may move up to a higher level or turn back owing to a variety of reasons, such as self-motivation, the teacher’s and peers’ support, or confusion about alternative information, and unfamiliarity with topics of study. The demonstrable features of critical thinking capabilities, accordingly, is subject to ‘degrees of sophistication’ and unlikely to be of equal weight in learning situations. The ‘pace’ and ‘extent’ of students’ overall transformation can also vary. Given the generic inclination of critical thinking, however, adjustment may be necessary to suit particular disciplinary needs.

In contrast to the rule-bound discipline, this developmental framework is more dynamic because it accords with students’ nature of thinking which can be nurtured in the socialised teaching-learning environment. Meyers (1986, pp. 44-49) proposes ways to encourage student interest by beginning a course with a problem and build on student interest by analogy referring to connecting ‘the content and methods of teachers’ disciplines’ with ‘students’ experiences and concerns’. The view of empathising with students’ interests is also supported by Bernstein (1995). Their arguments resonate with Vygotsky’s and Baxter Magolda’s theories from the constructivist perspective in that the teacher can make use of the concept of scaffolding to support students in the interactive learning or problem solving process. Students’ thinking is mediated by interactions between the teacher and students for whom meaning-making spaces are provided. The teacher guides students to passing through crossroads under the circumstances of interaction between participants. Students should gradually receive less support as they are more capable of carrying out their own tasks (Rogoff, 1990). The pedagogy for critical thinking, then, is not limited to development of knowing but responsive to

transformation of thinking through metacognating and extending critical reflections (Halx & Reybold, 2005; McGregor, 2007). Baillie et al. (2013) echo these contentions in emphasising that students' experience variation and reflection on experience should be ensured.

2.6 Summary

This chapter reviewed literatures defining critical thinking from philosophical, psychological, and sociological traditions encompassing the four approaches of the logic, competence, developmental shifts, and contextual influence. Critical thinking was then defined and characterised as a concept subject to epistemological development. The attainment of critical thinking leading to capabilities was regarded as a transformative journey with layered objectives. The two-way critical thinking framework was enlightened by four modes of variation in understanding threshold concepts and the TCITF at the conceptual and practical levels, and the integration of these frameworks contributed to the exploration of students' conceptual and practical progression in relation to epistemological, practical, and ontological development within this defined context. Taking the integrated view of critical thinking was the result of contemplating merits and weaknesses of different approaches to the appropriateness for the given setting. For the pedagogical purpose, as the teacher-as-researcher was required to be critically responsive, developing students' critical thinking through the teacher's facilitation was of significance. Given the claim on teaching critical thinking from the constructivist perspective, the pedagogical approach— problem-based learning resonating with the tenets of constructivism will then be discussed in the subsequent chapter.

Chapter 3 Problem-Based Learning

3.1 Introduction

Having established the critical thinking epistemological threshold framework in the previous chapter, this study is now considering PBL as the pedagogical approach that might facilitate its coming into being. This chapter starts by reviewing the characteristics of PBL relevant to this study, identifying the relationship between PBL and teaching-learning critical thinking, arguing that PBL is a constructivist model. PBL as a pedagogical approach is then defined to formulate the knowing-reflecting-stretching framework referring to spreading out to a new territory of knowledge arising out of the states of knowing and constant reflection. The curriculum design, adopted in this study, including designing the problems, the scaffolding process, and assessments are then introduced. This knowing-reflecting-stretching framework was concerned with ongoing spirals associated with the teacher's 'reducing guidance' from tight to loose facilitation to empower students to independently tackle their own study. The facilitation was rooted in the cyclic scaffolding model comprising the teacher's scaffolding, students' idea-proposing and developing, collaborative evaluating, presenting, leading to another new cycle after reflection and refinement. Considering student-centred teaching to be sensitive to variation in students' engagement with the context and content of learning (Meyer & Land, 2005), the teacher facilitated students to approach problems by providing various topic-problem scenarios related to the curricular themes based on the degree of complexity and adjusted the facilitation according to the actual learning situations. This chapter focuses on the principles of implementing PBL, yet the actual implementation will be discussed in Chapter 4.

3.2 Problem-Based Learning

PBL as a pedagogical approach was used on the premise that the teacher-researcher aimed to develop students' critical thinking; clarifying how PBL supports critical thinking is the focus of this section. It has been accepted that PBL correlates closely

with critical thinking (Barrows, 1992; Boud & Feletti, 1997; Delisle, 1997; Duch, 1995; Levin, Dean, & Pierce, 2001; Uden & Beaumont, 2006); in this defined context, their theoretical and practical linkages are yet to be explored. Given that critical thinking as a threshold concept brings about transformation in learning, the discussion focuses on PBL in support of educational objectives of mobilising knowledge for practical use bound up with epistemological, ontological, and practical development for both the teacher and students. As discussed in Chapter 2, Dewey (1910) provides a strong basis for understanding critical thinking as a process of enquiry and problem-solving. He also indicates how the resolution can be achieved through reflective thinking and argues that thinking starts from 'a perplexed, troubled, or confused situation and ends in 'a cleared-up, unified, resolved situation' (Dewey, 1933, p. 106). In the beginning 'pre-reflective' phase, a problem is set, out of which questions are raised to be answered through reflection. Through problems, students could learn best by doing and thinking, and the teacher should enter 'at the critical junctures' where the experience of students is insufficient for providing the requisite material (Dewey, 1933, p. 270). His pragmatic deliberation of the reflective problem-solving approach and teacher-student relationship provides the foundation for PBL with the emphasis on the development of reasoning (Barrows, 1996). Barrows (1986) argues that to resolve patient problems, learning driven by practical challenge and integrated into reasoning is required, which enhances structuring of knowledge. The problem-solving skills in the reasoning process can be sharpened 'through repeated practice and feedback' (Barrows, 1986, p. 481). In this process, the teacher acts as a facilitator guiding students' learning (Barrows, 1996). He places importance on the knowledge and skills to provide appropriate care for future problems which students must face. Stemming from learning experiences, practical skills are supported by knowledge associated with basic subject concepts.

Dewey and Barrows indicate the development of knowing and practical skills through reflective thinking for integration in the PBL reasoning continuum where students actively learn with the teacher's facilitation. Arising from this perspective, the definition of PBL involves variations. Barrows and Tamblyn (1980, p. 18)

consider it to be ‘the learning that results from the process of working toward the understanding or resolution of a problem. The problem is encountered first in the learning process and serves as the focus or stimulus for the application of problem-solving or reasoning skills, as well as for the search for or study of information and knowledge needed.’ Vernon and Blake (1993) regard PBL as a complex combination of teaching philosophy and learning objectives. The two studies suggest that PBL is not only a learning process in which students are expected to acquire knowledge and skills but also a principle encompassing goals to be achieved. PBL is hence deemed ‘a student-centred pedagogical strategy’ (Hoffman & Ritchie, 1997, p. 97), ‘an instructional approach’ (Uden & Beaumont, 2006, p. 25), and ‘a small group teaching method’ (Wood, 2008, p. 971). It can be interpreted either from the teacher’s or students’ perspectives (Dahlgren, Castensson, & Dahlgren, 1998). Clark (2006) synthesises these views by arguing that PBL revolves around small group learning, taken as an educational strategy concerning philosophy, curriculum, and learning outcomes. The literature suggests that PBL is concerned with teaching and learning and can be identified as a pedagogical tool or vehicle for achieving educational objectives and the quality of teaching and learning in the curriculum.

Through the analysis of a problem and research of the problem, students cultivate their reasoning process which helps to achieve understanding and the ability to formulate their needs, select and apply the most appropriate resources to satisfying the needs. In this course, they are motivated to learn problem-solving abilities and obtain knowledge about the basic and other disciplines by the use of problem as a context (Finucane, Johnson, & Prideaux, 1998). The capabilities they learn may help them generate new knowledge transforming their initial thinking. Applying their new knowledge to the problem, they reflect on what they learn and how effective the strategies are (Hmelo-Silver, 2004). Metacognitive development occurs through the course of reviewing the solution to the context and reflecting on knowledge (Downing, Kwong, Chan, Lam, & Downing, 2009). This reflection following an upward spiral pattern with engagement in higher-level metacognitive activities promotes their deep understanding and capabilities useful for real life.

The problem, in this sense, is a challenging trigger embedded in PBL as a starting point of the learning journey in which students are authors constructing their own meaning, and teachers are no longer traditional authority but facilitators guiding and assisting in students' learning. The transformation in the epistemological and practical aspects of learning is hardly detached from the teacher's and students' shift in subjectivity. Savin-Baden (2006) argues that PBL transforms the teacher and students in terms of identity, knowledge, and power and generates disjunction because the process could be troublesome. PBL, then, facilitates epistemological, practical, and ontological development though the transformative journey appears not to be straightforward.

3.3 PBL and Teaching and Learning Critical Thinking

From the discussion of the teaching-learning relationship, PBL enhances critical thinking from the constructivist perspective because it transforms the dominant role of a teacher as passing on knowledge in a traditional class into a supportive guide whose knowledge does not represent the definitive correct answer to the problem. Margetson (1997) identifies PBL as reflective, critical, and active learning indicating students and the teacher with knowledge, understanding, feeling, and interests work in a shared educational process where knowledge is considered to be complex and changeable. PBL, in this regard, responds to the principle of the philosophical underpinnings of constructivism in knowledge construction with students at the helm of their learning as well as the negotiation of meaning (Barrett, 2005; Brooks & Brooks, 1999; Hmelo-Silver, Duncan, & Chinn, 2007; Levin et al., 2001; Uden & Beaumont, 2006; Savery & Duffy, 1995). Savery and Duffy (1995) highlight the individual cognition embedded in the entire context where cognitive conflict is treated as the stimulus for learning and the determining factor in learning goals. Individual knowledge is consequently evolving through continuous social negotiation (Savery & Duffy, 1995). Their argument is agreed by Hendry, Frommer, and Walker (1999) stressing the interrelation between the individuals and the world in the process of knowledge construction. PBL in tune with the central tenets of constructivism is thus tailored to students' cognitive, affective, and social skills needed for practice (Levin et al.,

2001). Students are required to actively build knowledge based on their experience with content and context towards the integration of 'knowing that' and 'knowing how' (Uden & Beaumont, 2006). By creating new understandings, new cognitive structures emerge and transformation occurs (Brooks & Brooks, 1999). The implication for the teacher is that curriculum should be built on the foundation of students' knowledge and experiences to fulfil their potential for constructive meaning-making.

Though PBL theoretically has the potential for improving critical thinking; in practice, empirical studies tell different stories. Tiwari, Lai, So, and Yuen (2006) compared the effects of PBL and lecturing approaches on 79 undergraduate nursing students' development and found that the PBL students in the encouraging environment had significantly higher overall critical thinking disposition scores than the lecture students. Chan's (2013) study suggested that PBL could effectively facilitate critical thinking by adopting teaching innovations such as poetry writing and role plays. Yuan, Williams, and Fan's (2008) computerised review of providing proof of nursing students' critical thinking through PBL, by contrast, did not suggest sufficiently supportive evidence. Oliver (2001) studied 75 undergraduates in a multimedia course to determine how their critical thinking skills developed in a web-supported PBL environment. The outcome did not suggest the successful influence of PBL on developing critical thinking skills but identified the importance of a strategic and effective setting for implementation. Anderson II (2007) also discovered no statistical differences between the effect of PBL and that of teacher-guided learning on critical thinking ability, yet the reflection statements collected from students in the PBL group and the teacher showed that the PBL students learned the content at a higher level of cognition than the control group. These findings tend to suggest the gap between theory and practice of the extent to which PBL supports critical thinking and imply that the contribution of PBL to developing critical thinking can still be promising under the right conditions of strategic curricular design and management as well as adequate tutoring and resources. They also indicate the difficulty of measuring critical thinking in terms of epistemological development, and using multiple methods

including participants' reflection instead of mere tests can be more appropriate.

This study, accordingly, treats PBL as a pedagogical approach consisting of two levels. At the pedagogical level, PBL is a teaching-learning vehicle starting from ill-structured problems to encourage students to learn in an active and self-directed manner. The students' learning process was given primary attention; according to students' responses, the teacher-researcher as a reflective practitioner adjusted the teaching strategies. At the curricular level, it points to the educational philosophy designed to achieve the goal of cultivating knowledgeable and competent people capable of dealing with real life and the uncertain world through the changing relationship between the teacher and students. PBL, hence, can be featured as:

1) a dynamic learning process with the acquisition of knowledge and skills encapsulated in educational objectives;
2) self-directed learning starting from an ill-structured problem used as the contextual base;
3) ongoing learning following an upward spiral pattern instead of the finalisation of a project because PBL involves metacognition and epistemological development;
4) collaborative work between the teacher and small-groups of students in an interactive environment where the participants may experience shifts in identity and capabilities in relation to the cognitive, affective, and social aspects of learning.

The theoretical and practical studies above suggest the contribution of PBL to developing critical thinking capacity for knowing and reasoning towards the integration of ideas and new meaning-making through constant reflection, implying the process of knowing, reflecting, and stretching to the next epistemological stage. Knowing refers to the acquisition of knowledge and the status of understanding. Reflecting is a process of looking back at the past for improvement and looking forward to the future for action (Lähteenmäki & Uhlin, 2012) involving the evaluation of knowing. Stretching denotes the capacity for expanding to different areas by integrating various views and making meaning. On

the basis of knowing, students reflect on the self and context and stretch self-knowing and capabilities to the wider environment. The three dimensions shape spirals circulating between stages in the upward direction, for stretching creates new knowing moving towards a higher stage. The movement in this framework in response to critical thinking development is presented in Table 3.1.

Table 3. 1 The PBL knowing-reflecting-stretching framework in response to critical thinking development

Transformative stages	Descriptions	Knowing	Reflecting	Stretching
Contextual knowing / post-liminal mode (External dependence< internal independence)	Evaluation — deeply reflecting on knowing in the frame of reference or context	Evaluation of contextualised knowledge by considering different frames of reference	Deep reflection on the self and relating to the world for meaning-making	Productive capabilities to stretch out to different disciplines and develop the most appropriate frame of reference
Transitional crossroads level 3				
Independent knowing / liminal mode (External dependence < internal independence)	Clarification— distinguishing self-knowing from others' and considering different perspectives on interpreting one thing	Clarification of uncertain knowledge from different perspectives	Adequate reflection on the self and consideration for the environment	Competent ability to integrate different areas of study
Transitional crossroads level 2 (External dependence ≒ internal independence)				
Transitional knowing / preliminal mode (External dependence > internal independence)	Awareness — recognising what is known and considering how it is known	Awareness of uncertain knowledge	Limited reflection on the self, probably based on personal experiences related to the happenings	Restrained capacity for widening the vision, probably because of lack of sufficient knowledge
Transitional crossroads level 1				
Absolute knowledge / subliminal mode (External dependence > internal independence)	Acceptance — accepting what is informed without critically considering the background	Acceptance of information as certain knowledge	Scarce reflection on the self and biased comment on issues	Incompetence to extend current thinking to other areas

This framework requires the teacher's facilitation pushing students forward. Students at lower stages might need background knowledge and the teacher's guidance, while students at higher stages might find the teacher's constructive comments on their independent work helpful. Provided that the strategic curricular design and appropriate facilitation are of necessity, PBL in this study lies in creating problem scenarios to challenge students' thinking, developing the learning task to reflect the complexity of the environment, testing ideas with alternative viewpoints, supporting students to develop their ownership for their work, coaching students for a solution, and encouraging students to reflect on the journey. In response to the knowing-reflecting-stretching framework, the following sections focus on the PBL curricular design, including designing problems, the PBL scaffolding process, and assessment.

3.4 The Curriculum Design

Engel (1997, p. 23) maintains that the PBL educational environment and curricular design comprise four aspects: 'cumulative learning' centring on increasing sophistication, 'integrated learning' as opposed to the separate presentation of various subjects, 'progression in learning' referring to the adjustment of the curriculum according to the degree of students' maturity, and 'consistency in learning' meaning the implementation in support of the curriculum. He suggests the gradual, flexible but systematic flow of PBL based on the actual learning situations; Conway and Little (2000) further argue for the significance of disciplinary defining concepts applied in real-life teaching contexts and practical content as process. Critical thinking as a threshold concept, therefore, was embedded in this course and intertwined with content knowledge, and students were expected to exhibit their understanding of this concept as capabilities through their empirical research on real-life cases pertaining to various but interrelated topics. The critical thinking epistemological threshold framework developed in Chapter 2 was used to identify their increasing sophistication. The teacher observed their development and accordingly adjusted the way of facilitation, on the basis of which the teaching-learning relationship might transform. Arising from students' knowing, the teacher and students reflected on the learning process and then refined

for stretching out for a new territory. The journey was linked with epistemological, practical, and ontological development not only for the students but also for the teacher designing this curriculum.

3.4.1 Designing Problems

For the purpose of encouraging students' increasingly sophisticated development of critical thinking defined as internalised quality, designing the problems was not about training students to acquire knowledge to solve problems following a mechanical process (Hillman, 2003). Barrett, Cashman, and Moore (2012, pp. 18-19) remind curriculum designers of the necessity of negotiating the interrelationships between 'problems and challenges from practice and real world, desired graduate attributes, key concepts, and learning outcomes'. In consideration of students' unfamiliarity with the innovative pedagogical approach, this study designed the problem scenarios according to the degree of complexity and abstraction, that is, from simple to complex topics and from concrete subjects to abstract concepts (Figure 3.1).

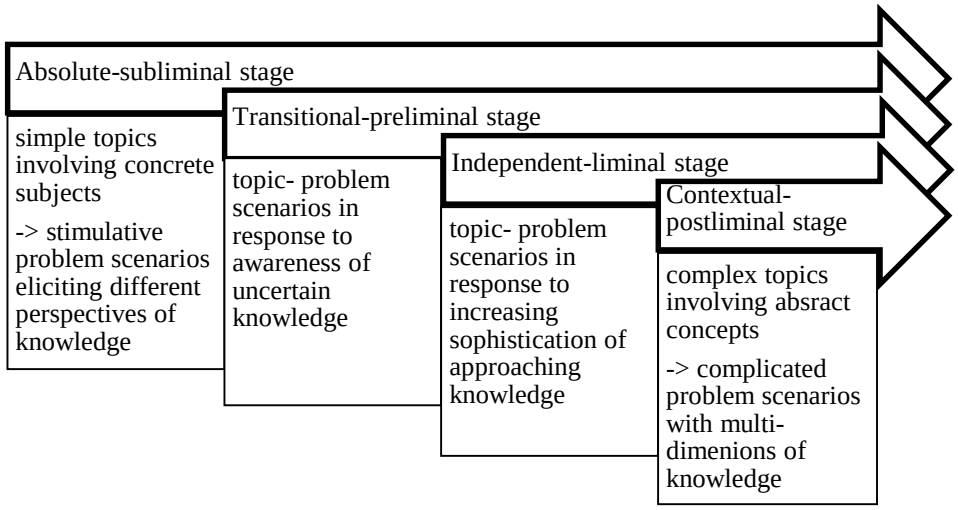

Figure 3. 1 PBL problem design in response to the increasing sophistication

These topic-problem scenarios, though, did not flow from easy to difficult cases but reflected more dimensions of knowledge required to be involved towards the end of the course. Arising out of real-life situations, the problem scenarios were

not isolated from each other but linked to different aspects of the themes. As the PBL process proceeded, the accumulation of knowledge produced more complexity of study and required students to evaluate, select and integrate different ideas. At the beginning of this course, the teacher raised questions to understand students' initial knowledge and understanding in relation to the content and context of study. For freshness and diversity, the teacher drew on resources from newspapers, television news, the Internet, and films to design problem scenarios. For example, she presented the tendency to using technology of particular brands to connect people. From news reporting, television episodes, and movies, smart phones have been widely used; through the media, the popularity of using particular smart phones in real life has tended to be enhanced. The news media appeared to follow and create the fashion because of the audience's preference and profits. This problem scenario could be analysed from various viewpoints such as culture and business; students then chose cases related to the topic to narrow down the problem scenario and generate their specific problems, raise learning questions, search information, and present ideas, requiring them to exhibit critical thinking capabilities (Figure 3.2). In this process, Delisle's (1997, p. 32) idea-organising from 'ideas', 'facts', 'learning issues', to 'action plan' might be of use to them to map out what they aimed to learn.

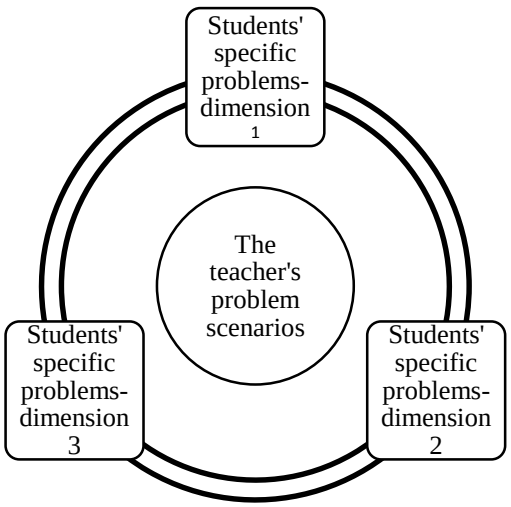

Figure 3. 2 Students' problem identification in response to problem scenarios

The idea of designing the problems in this study was oriented around exploration rather than searching for the correct answer. Although studies have suggested that PBL supports students to know the consequence of the task in 'liminal spaces or states' linking existing and new ways of thinking conceptually and empirically (Barrett et al., 2012; Walker, 2013), accompanying increasing sophistication might be discomfort with the increasing freedom (Hoffman & Ritchie, 1997). In helping students to pass through the learning crossroads, the teacher's strategic facilitation can be the key factor.

3.4.2 The PBL Scaffolding Process

As PBL requires students as protagonists to actively come to grips with their own learning, facilitatory teaching skills might play a crucial part (Barrow & Tamblyn, 1980). Savery (2015, p. 11) emphasises that PBL is distinguished from case-based, project-based, and enquiry-based learning in that the PBL tutor supports learners in setting their own 'goals and outcomes for the problem' but 'does not provide information related to the problem'. Challenging Kirschner, Sweller, & Clark's (2006) conflation of PBL with unguided or minimally guided learning, Hmelo-Silver, Duncan, and Chinn (2007, p. 105) contend that PBL involves 'appropriate scaffolding in the conceptualisations of the discipline' whereby the cognitive load of heavy use of limited cognitive-processing capacity is reduced. The tension between the teacher's guidance and how students took control of their own tasks should thus be tackled. Considering 'challenge and support' through learning partnerships (Baxter Magolda, 2004, p. 43) as well as the balance between the flexibility of the PBL process and student support (Wood, 2006), the teacher-researcher took an approach of 'reducing guidance' in response to students' 'increasing sophistication'. Students' achievement of critical thinking and metacognitive thinking was expected to be difficult, especially in the early phases of this research. The teacher mediated through lectures with discussions and class activities for idea-clarification or brainstorming and attempted to empower students to take responsibility for their study. As students' sophistication was enhanced, the teacher's guidance was reduced; that is, the teacher's 'tight facilitation' with basic content knowledge gradually became 'loose facilitation'.

This strategy echoes Rogoff's (1990) argument that support provided for students should be gradually lessened according to their transformation discussed in Chapter 2. Given the classroom research where the teacher took the lead, 'the floating facilitator' model described by Duch (2001) was used to probe small-groups of students' understanding of problem analyses through interactions and observed their cognitive, affective, and social aspects of learning.

The learning journey, however, was unlikely to be linear as what individual students learned from this process was integrated into their existing knowledge and skills (Barrows & Tamblyn, 1980, p. 192). Different students might achieve different epistemological stages. Although the overall direction of the teacher' facilitation was oriented towards reducing guidance, the tight to loose facilitation could be adjusted on the basis of the actual learning situations. This facilitation did not mean that the teacher gradually ignored students' needs; rather, the teacher raised questions to elicit student's own thinking. This also required constant reflection on the learning process from both the students and the teacher to identify how to 'approach, recognise, and internalise' critical thinking as a threshold concept in this class (Land, Cousin, Meyer, & Davis, 2005, p. 57). Starting from students' knowledge and needs, the reflective adjustable facilitation was rooted in the cyclic scaffolding model comprising the teacher's scaffolding, students' idea-proposing and developing, collaborative evaluating, and presenting. The teacher provided the problem scenarios with real-life examples through multiple media, and students were required to identify problems and generate questions about the problems. They developed their ideas by conducting research and evaluated the information with peers and the teacher, discussed the pros and cons of potential solutions, and selected useful ideas to present their solutions. The procedure resonates with Levin et al.'s (2001) contention for the critical elements in a PBL framework, yet in response to the knowing-reflecting-stretching framework helping students to cross transitions, reflecting and refining were of particular importance to integrate newly-acquired knowledge and skills into existing ones, leading to another new cycle. The teacher thus gradually loosed guidance as students became more independent (Figure 3.3).

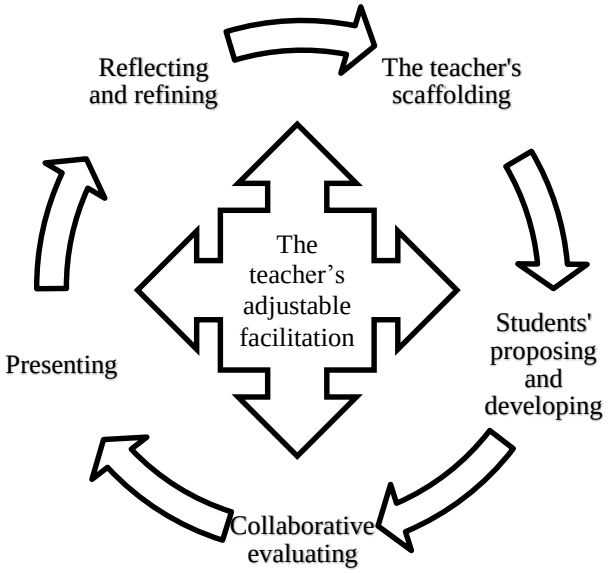

Figure 3. 3 The teacher's scaffolding model with tight to loose facilitation

During the process of analysing problems for developing critical thinking capabilities, the relationship between the teacher and students might transform provided that the PBL framework in this study was subject to the epistemological, practical, and ontological development. The teacher-researcher's role might be multiple, as an instructor, facilitator, or assessor because she was required to guide, scaffold, and offer feedback for students to reflect on their past and now for the future action. Adequate assessment for both the teacher and students to know the progression and attainment of critical thinking constituted an essential part of the success of the PBL course.

3.4.3 Assessments

The assessment criteria for the attainment of critical thinking were established in Chapter 2. For the purpose of developing students' critical thinking, the ongoing PBL knowing-reflecting-stretching spirals and the cyclic scaffolding model were implemented, along with multiform methods of assessment to investigate students' learning experiences and incorporate personal interpretations and reflection. Assessments were embedded in the PBL experience, and ongoing assessing

accompanied facilitation throughout the sequence of the problem analysis. At the beginning of the PBL course, the teacher provided the information, including the purpose, the content, the schedule, and evaluating criteria for students to know what and how to do in advance; the first four weeks thus focused on preparing them to be familiar with the process by approaching various current issues. During the one-semester 18-week course, the 35 students undertook three group presentations as projects and three 150-words individual writing tasks in the first half of the semester and one group presentation, one talk show, one group discussion in conjunction with 250-word individual writing tasks in the second phase, for the sake of involving different class activities. Midterm formal group and individual assessments were conducted in the 9th week, the middle of the semester, and final formal assessments took place in the 18th week. The teacher gave weekly feedback on students' group presentations and individual assignments (Table 3.2). Students could continuously work on the same topic for exploration after receiving the feedback from the teacher to improve the quality of their presentation and writing assignments. All of these resources, including the course information, the teacher's teaching materials and feedback on students' works were available on e-course online system accessible to the enrolled students of this university. Students were free to upload their reflective opinions after receiving the teacher's comments.

Table 3. 2 The schedule of PBL assessments

Week	Students	The teacher
5th	Group presentation 1 + Individual writing 1	Feedback
6th	Group presentation 2 + Individual writing 2	Feedback
8th	Group presentation 3 + Individual writing 3	Feedback
9th	Midterm formal assessment: group presentation + individual writing	Comments
13th	Group presentation 4 + Individual writing 4	Feedback
14th	Talk show (no scoring)+ Individual writing 5	Feedback
15th	Group discussion (no scoring)+ Individual writing 6	Feedback
17th		Final facilitation of students' final projects
18th	Final formal assessment: group presentation + individual writing	Comments

Together with the repeated assessment and feedback, students' weekly journals were likely to give an indication of development to link theory with practice because they were prompted to reflect on what they learned in each of the steps. Students' insight into learning might be unfolded in the 'private comfortable space' in contrast to the 'public disconcerting environment' where they had to present their ideas to be challenged. The structure led to higher validity, for it considered not merely the assessment of knowledge but the in-vivo reflection on the group and individual learning process (Curle, Wood, Haslam, & Stedman, 2006). Students' perceptions and reflections were then compared with the teacher's evaluation and observations associated with reflections written in weekly journals. Observing and recording how they did on a number of occasions were proceeding to grasp their transformative pattern.

3.5 Summary

Different from traditional paradigms underscoring memorising content to prepare for tests, PBL aims to inspire students' interest in active learning. Students cultivate their capacity by acquiring necessary skills and practical knowledge in collaborative learning to cope with the dynamic complexities of the world, transforming their thinking for action. This study was absorbed in examining the extent to which PBL contributed to the attainment of critical thinking, students' learning experiences and critical thinking development in the PBL process. Critical thinking played a central role as a threshold concept in the problem design of the PBL process, and the knowing-reflecting-stretching framework laid the foundation for triggering students' learning journeys. As Barrett (2010, p. 173) regards the PBL trajectory as 'a process of finding and being in flow', the crucial value of PBL consists in not only the acquirement of knowledge but also the process that may be transferable 'across a wide range of situations, in higher education and in different workplaces'. With the teacher's 'reflective adjustable facilitation' rooted in the cyclic scaffolding model towards the resolution of problems and continuous assessment based on the critical thinking epistemological threshold framework, students might cross the difficulties and increasingly develop their confident autonomy useful for their future although the end of the journey was yet to be seen.

Chapter 4 Media Literacy

4.1 Introduction

This study was aimed at developing critical thinking in the higher education media literacy class, a PBL pedagogical approach was adopted to examine the evidence of students' critical thinking capabilities for 'reading' and 'writing' about the media. This chapter begins by defining media literacy and identifying critical thinking as a threshold concept in media literacy education and then outlines the PBL implementation in the media literacy class focusing on studying news media specifically. Situated in a context based on scholarship in media literacy and journalism education, the teacher-as-researcher's work in higher education was mainly driven by the need to strengthen students' skills of critically accessing television news, print media, the Internet, and advertising in association with daily life. Media literacy, however, is not only a repertoire of technical skills operating technologies but also the quality of making good use of these skills. This requires critical thinking as the nucleus because it involves considering multiple perspectives, analysis, judgement-making, and evaluation. PBL as a pedagogical approach to mobilising knowledge for practical use could be useful for helping students to deconstruct media messages, reflect on media texts, audience, and productions and construct new meaning.

4.2 The Definition of Media Literacy

The field of media literacy is inseparable from media education. Worsnop (1999, p. x) claims that media education is 'a broad description of all that takes place in any media-oriented classroom', while media literacy is the expected 'outcome of work in media education' and considered to be the result of achieving 'the skills of experiencing, interpreting, analysing and making media products'. Buckingham (2003, p. 4) also argues that media education aims at cultivating a 'broad-based competence' referred to as 'a form of literacy'; in this sense, media education as 'the process of teaching and learning about media' is distinguished from media literacy taken as the outcome of acquiring knowledge and skills. The outcome-skill

view of explaining media literacy appears to be widely accepted. In relation to the teaching and learning of media literacy in the changing educational environment where PBL was used with the aim of promoting critical thinking, this study considers both knowledge and skills required for understanding.

With the paradigm shift from the viewpoint that audiences should be protected from the harmful influence of the media to that viewers are empowered with the awareness of how media messages are conveyed (Cheung, 2009), the way of viewing the media and audience has also changed. The media nowadays are not merely subject to one-way transmission, and audiences are not passive individuals exploited by the media. As argued in Chapter 2 and 3, understanding critical thinking requires knowledge leading to capabilities, and PBL encourages students to acquire the knowledge and skills required for real life. Applying critical thinking through PBL in the media literacy context, then, should respond to this educational requirement. Many writers refer to media literacy as either knowledge or ability. Aufderheide & Firestone (1993, p. 6) regard media literacy as 'the ability of a citizen to access, analyse, and produce information for specific outcomes' of evaluation. Kellner and Share (2005) take a critical view of media literacy involving nurturing skills, abilities, and competencies to analyse and interpret media messages, as well as evaluate, dissect, and construct media. Danesi (2009, p. 193), by contrast, considers media literacy to be 'in-depth knowledge of how the media work and how they might influence audiences' in psychological and social dimensions. Being exposed to various kinds of media and using media at an increasing rate with the advent of new technologies, students should be familiar with media literacy which is becoming requisite knowledge and an essential skill in today's world. The Association for Media Literacy therefore identifies media literacy as the knowledge and skills requisite for understanding and using various forms of media properly (Association for Media Literacy, 2015). Thoman and Jolls (2004) also contend that media literacy is both skills and knowledge with different emphases and stress the importance of connecting ideas for exercising full citizenship in a democratic society.

Despite the binary system of knowledge and skills, other authors have endeavoured to broaden the content of media literacy. De Abreu (2007) adopts a scientific stance and considers the requirement of media literacy the validation of the ways in which media play a crucial role in humans' lives. A rational method is thus a significant element. Taking notice of the political characteristic of media, Kellner and Share (2007, p. 8) theorise 'critical media literacy' as a framework to include 'issues of social context, control, and pleasure' for analysis by revealing the relationship between the media, information, and power in society. Cappello, Felini, and Hobbs (2011, p. 71), similarly, take media as 'cultural-social-economic institutions', indicating understanding media literacy should not be confined to mechanical interpretations. Buckingham (2003, p. 38) indicates the necessity of a broader understanding of social, economic, and institutional contexts of communication to achieve media literacy concerning 'analysis, evaluation and critical reflection'. Media literacy aiming to connect theory and practice (Buckingham, 2009) is an integrated concept considering the media, audiences, and wider environment. Potter (2014, pp. 17-20) provides a comprehensive description of media literacy as a multidimensional concept more than the cognitive domain and continuum encompassing three building blocks of 'personal locus', 'knowledge structures', and 'skills' consisting of analysis, evaluation, grouping, induction, deduction, synthesis, and abstracting. Echoing the knowledge-skill goal of education, he emphasises humans' action which implies that media literacy empowerment aligns the individual and recognises media literacy as a process of development (Potter, 2014). His argument resonates with Jolls's (2012), denoting that critical practice to which theory is applied is subject to progression. They both view media literacy as not merely an outcome but a process which tends to be more applicable to the learning journey. In synthesising these definitions grounded on different perspectives, the involvement in knowledge and skills, rationality, consideration of the wider social context, and a developmental process are critical elements of medial literacy. However, interpreting media literacy through rationality might be at the risk of arriving at a predetermined position, and ideology critique may fall into promoting achievement of ultimate objectivity. These concerns can contradict the nature of critical thinking and PBL involving ongoing enquiry in a collaborative

learning environment. Understanding media literacy, then, should not be reduced to mastery of the mechanical procedure.

The original theoretical framework for medial literacy involving key areas of text, audience, and production affecting media representations can be traced back to Eddie Dick and the Scottish Film Council. The central concept is that all communication is a construct of reality with no neutral descriptions, according to which questions can be raised to help students deconstruct the media. Buckingham (2003, p. 54-60) expounds by listing detailed questions in terms of four key concepts: 'production, languages, representations, and audiences' (Table 4.1). In an attempt to concentrate on news media, including newspapers, television news, and online news in relation to the rising social media, this study adapted Buckingham's four key concepts and subheadings to contain questions for thinking in response to the sphere of journalism.

Table 4. 1 Key concepts of media literacy and questions from Buckingham (2003)

Production	
Technologies	What technologies are used to produce and distribute media texts? What differences?
Professional practices	Who makes media texts? Who does what, and how do they work together?
The industry	Who owns the companies that buy and sell media? How do they make a profit?
Regulation	Who controls the production and distribution of media? Are there laws about this, and how effective are they?
Circulation and distribution	How do texts reach their audiences? How much choice and control do audiences have?
Access and participation	Whose voices are heard in the media? Whose are excluded, and why?
Languages	
Meanings	How do media use different forms of language to convey ideas or meanings?
Conventions	How do these uses of language become familiar and generally accepted?
Codes	How are the grammatical 'rules' of media established?
Choices	What are the effects of choosing certain forms of language— such as a particular type of camera shot?
Combinations	How is meaning conveyed through the combination or sequencing of images, sounds or words?
Technologies	How do technologies affect the meanings that can be created?

Representations	
Telling the truth	How do media claim to tell the truth about the world? How do they try to seem authentic?
Presence and absence	What is included and excluded from the media world? Who speaks, and who is silenced?
Bias and objectivity	Do media texts support particular views about the world? Do they put across moral or political values?
Stereotyping	How do media represent particular social groups? Are those representations accurate?
Interpretations	Why do audiences accept some media representations as true, or reject others as false?
Influences	Do media representations affect our views of particular social groups or issues?
Audiences	
Targeting	How are media aimed at particular audiences? How do they try to appeal to them?
Address	How do the media speak to audiences?
Uses	How do audiences use media in their daily lives?
Making sense	How do audiences interpret media?
Pleasures	What pleasures do audiences gain from the media?
Social differences	What is the role of gender, social class, age and ethnic background in audience behaviour?

These concepts serve as a useful guideline for understanding the news media literacy context in Taiwan where cable television news has proliferated. Fleming (2010, p. 125) argues that cable television news has changed the information ecosystem by turning news values and professional criteria into an hourly rush to fill news holes referring to 'amount of content a news provider— broadcast, print, and now online— needs to create in a news cycle'. By implication, Langer (1997) lists a series of propositions of television news; for example, television news is market-oriented, the business of entertainment, dependent on filmed images rather than information content, involves emotionalism and exploitation. His descriptions seem to be pessimistic but somewhat reflect the news environments in some capitalistic countries, including Taiwan. The technology-driven market pays more attention to 'profitable' effects on raising audience rating and earning more from advertising; superficial news stories thus tend to be chosen to fill news time.

In consideration of the content and context of media literacy, this study defined media literacy as:

1) the capacity for deconstructing media messages, comprehending and analysing how and why the media operate, considering and evaluating the negatives and positives, linking the knowing and the wider political, economic, and social context for reflection, deeper meaning-making and meaningful production;
2) the internalised quality encompassing knowledge as the internal base leading to competence. The competence requires the understanding of the four key concepts: production, languages, representations, and audiences; and
3) a developmental process concerning cognitive, affective, and social aspects of learning with layered outcomes.

This definition is illuminated by the critical thinking epistemological threshold framework built in Chapter 2, for in addition to the content-oriented knowledge of production, languages, representations, and audiences, media literacy requires critical thinking as the core to achieve understanding and demonstrate capabilities.

4.3 Critical Thinking as a Threshold Concept in Media Literacy

At the policy level, the Ministry of Education (TMOE, 2012b) in Taiwan and Department for Cultures, Media and Sports (DCMS, 2001) in the UK mention the significance of critical thinking in media literacy. At the curricular level, UNESCO introduced a Media and Information Literacy (MIL) Curriculum in 2011 to encourage citizens to actively engage with media and develop critical thinking skills (Wilson, 2012). A number of authors have also suggested that media literacy are tied up with critical thinking (Buckingham, 2009; Capello, Felini, & Hobbs, 2011; Jolls, 2012; Radeloff & Bergman, 2009; Silverblatt, 2001) and the positive effect of teaching media literacy on improving critical thinking skills (Arke & Primack, 2009). Silverblatt (2001) describes media literacy as a critical thinking skill that enables people to make good judgements about deciding appropriate information and places importance on understanding the impact of media and developing strategies to analyse media messages. Radeloff and Bergman (2009)

maintain that critical thinking underpins decision-making and was thus incorporated into their course for critical analysis of women's issues. Thoman and Jolls (2004) indicate that media literacy involves higher order thinking skills, such as identifying key concepts, connecting ideas, questioning, and responding coupled with factual knowledge to form intellectual enquiry, and critical thinking is systematically applied to production (Jolls, 2012). In Potter's (2014) definition mentioned above, the 'skills' building block containing a set of abilities also refers to higher-order thinking. Alvermann and Hagood (2000), nevertheless, remind that media literacy is more than cognitive thinking skills, implying that critical thinking in media literacy is not a neutral idea but a complex concept concerning context.

The ability to interpret media relates to understanding of complex contexts of communication, requiring the capacity to work with a variety of ideas and expand one's background knowledge and beliefs to consider alternatives. As critical thinking is often used in media literacy, Kipping (2000) takes a critical thinking approach to television that can be applied to other media. He describes the key concepts of critical thinking in the media field as: 1) a productive activity, 2) a process, 3) thinking triggered by positive and negative events, and 4) thinking involving feelings and reasons. His contention about critical thinking supports that in this study, by virtue of which the dependent relationship between media literacy and critical thinking is clear, whereas their differences might not be apparently discriminating. Media literary hinges on critical thinking to deeply understand the media, but explaining media literacy as the expected outcome only appears to ignore the learning dynamics.

In response to critical thinking, theoretically, logic and rationality under the philosophical camp provides the foundations for media literacy which needs adequate judgement-making for analysis. The psychological view of teaching and learning is connected with critical knowledge (Buckingham, 2014), and the social context is hardly to be separated from the community of enquiry where the teacher and students are engaged in learning. Media literacy and critical thinking are reciprocal in response to the educational aim and the learning process towards the integration of various notions in the higher educational setting although media

literacy is not the equivalent of critical thinking. In media literacy, critical thinking is a threshold concept resulting in critical capabilities to deconstruct and construct messages in consideration of production, languages, representations, and audiences embedded in the wider political, economic, and social contexts (Buckingham, 2003). Critical thinking placed at the heart of media literacy facilitates to internalise the content, assess the quality of the internalisation through real problems for meaning-making (Elder & Paul, 2010). Media literacy therefore reacts to critical thinking as a transformative process from naive to sophisticated states with layered objectives that can be achieved. In the learning process, the purport of this study was then to investigate how students demonstrated critical thinking capabilities integrated into the media literacy context.

4.4 Teaching and Learning Media Literacy

In the Web 2.0 world where technology allows for 'quicker and broader sharing of information', students and teachers might encounter difficulties in evaluating the credibility of the media messages due to a large amount of unfiltered information (Gainer, 2010, p. 69). The use of ICTs has resulted in the plurality of educational spaces (Brooks, Fuller, & Waters, 2012). New media have changed the ways of teaching and learning leading to 'participatory culture' (Jenkins, Purushotma, Clinton, Weigel, & Robison, 2006), easier access to 'artistic expression' and 'civic engagement' (Lin, Li, Deng, & Lee, 2013, p. 166), and 'open technologically mediated environment' (Conole, 2012, p. 219). With the emergence of new media technologies and changing relationships between young people and the media, the environment has become more heterogeneous because many contemporary students are not only media consumers but those who produce and exhibit media content. These new trends, however, should not diminish the status of traditional 'reading' and 'writing' approach to media literacy required for understanding news media messages and publishing ideas. As Thoman and Jolls (2008) suggest, the learning process needs constant engagement and interaction for media construction. In teaching media literacy, these authors' concerns imply that a collaborative and reflective pedagogical model can be appropriate.

As argued in Chapter 2, knowledge is constructed and related to the wider context. It can be questionable to regard students as passive receivers of media messages or victims of media influence, and the teacher's task is not to protect students from the harmful influence of the media and make rational, objective, and politically correct decisions but to allow the possibilities of negotiation. Instead of confining students to keeping their distance from what they watch, read, and hear, PBL beginning from their existing knowledge and experience to prepare for the real world can be accommodated to the changed media literacy environment because the classroom is not a neutral space of scientific enquiry into objective truth but a social arena where the teacher and students engage in an ongoing negotiation. In the process, the teacher should bear the pedagogical implications in mind. First, providing that media literacy is not reduced to a mechanical term, people who possess advanced technological skills cannot be conveniently said to be media literate; neither are those who are frequently exposed to the media. Second, 'pleasure' can be a significant reason for young people to access the media (Buckingham, 2003; Capello, Felini, & Hobbs, 2011); popular culture through news or other forms of media can therefore be influential in their everyday life. Third, students' cognitive diversity in the classroom cannot be ignored. Media literacy aligned with critical thinking, then, is to allow for cognitive and social benefits, conceived as a social practice (Luke & Freebody, 1997).

Understanding news media literacy requires the sensitivity to the changing context that the top-down predominance of news media has changed owing to the shifting landscape from the firm-led, producer-generated media information to 'user-led, consumer-generated content' such as 'citizen-journalism and peer-to-peer social networks' (Hartley, 2009, p. 310). In applying in the classroom, students should be encouraged to construct and create their own meaning. Kellner and Share (2007) maintain that media literacy risks functioning as social reproduction of education without transformative pedagogy. Fleming (2010) connected constructivist pedagogy with the multidimensional media environments to undertake news media literacy projects. The findings suggested that media literacy courses could be more powerful when students were involved in the content questioned and examined and

a constructivist approach to media literacy was effectual in creating a habit of critical news media analysis. Acknowledging the importance of considering media choices from students' perspectives rather than from the teacher's perceptions of what students might be interested in, this study used PBL echoing constructivist pedagogy administering to students' transformation of learning experiences. Starting from students' media knowledge, the teacher facilitated their progression in the learning journey through the knowing-reflecting-stretching framework with the cyclic scaffolding. The pedagogy intended to reflect broader interrelationships of complex elements in the media world, and critical analysis should be situated in a wider understanding of media operation. From raising questions to students, the teacher facilitated them to critically analyse the media content, attend to others' ideas, and justify and challenge their own media perceptions through constant reflection.

4.5 Implementing PBL in the Media Literacy Class

McDougall and Sefton-Green (2014) indicate that media literacy is challenged by lacking coherence between curriculum content, assessment and the aims of policy. To promote critical thinking with knowledge and capabilities dimensions rather than the mere 'vocational' and 'functional' values and the emphasis on 'the commercial dimensions of the market' (Buckingham, 2014, p. 9; COST, 2013, p. 9), this study built the curriculum content and assessment based on the critical thinking epistemological threshold framework, as outlined in Chapter 2. In relation to the PBL implementation in this class, Buckingham (2003, p. 143) develops a media literacy curriculum model embracing the following elements:

- helping students make their existing knowledge explicit;
- enabling them to render that knowledge systematic, and to generalise from it; and
- encouraging them to question the basis of that knowledge, and to extend and move beyond it.

It is a dynamic model based on Vygotsky's theory, according to which students can move back and forth between action and reflection in the collaborative process (Buckingham, 2003). He further argues for the fundamental significance of students' emotional investments in the media. The knowing-reflecting-stretching framework established in Chapter 3 resonates with his model because the pedagogy started from students' knowledge and experiences and facilitated them to cross transitions with the engagement in reflection. The teacher's regular observations on students' reaction and performance in class and participants' weekly journals after each lesson were thus involved.

4.5.1 The Procedure

At the beginning of the media literacy course, 35 undergraduate student participants divided into seven small groups were provided with the course objectives describing the aims they were encouraged to achieve (Table 4.2). Recognising the importance of negotiating with stakeholders for constructing topic-problem scenarios as stimuli, the teacher raised three pairs of pre-class questions to collect students' general views of news media and the information about the topics that appealed to them and then designed what was required to include under the two main themes: *news media and propaganda* and *news media and views of the world* in the first and second phases of the 18-week semester. Students' responses are presented in Appendix A. Their responses were miscellaneous and overlapped; however, there were tendencies that they regarded television and the Internet as the most influential media which might affect people's views of the world. Although students' impression of news tended to be negative, they admitted their knowing to be limited. In the hope of stimulating students' ideas, various topics subject to the level of complexity were arranged in association with materials and resources available on the online e-course. The three topics under the first theme were entertainment news, technology, and advertising and the other three under the second theme were media bias, stereotype, and cultural imperialism vs. globalisation from which students could freely choose any related current events to study, analyse, and explore. As media literacy context is sensitive to social phenomena and inherently contextual, the teacher offered

updated news issues as examples to probe the interrelationship between the ideological operation of news media and the news content. These news examples were embedded in some lectures on content knowledge of journalism at the beginning of the course because these students were not majors in this discipline. These lectures with examples went hand in hand with class questions raised for students to think and discuss. This mixture might sparkle up their thoughts of their following actual undertakings. The teacher' instruction was expected to turn into student-led discussions whereby students gradually took up the dominant roles in class as their sophistication increased. Accompanying their increasing sophistication was the teacher' looser facilitation.

Table 4. 2 Media literacy course objectives

The course aims to cultivate students' critical thinking in media literacy, which refers to the capacity for deconstructing media messages, comprehending and analysing how and why the media operate, considering and evaluating the negatives and positives, linking the knowing and the wider political, economic, and social context for reflection, deeper meaning-making and meaningful production. Students are encouraged to demonstrate critical thinking capabilities including: 1) clear questioning of ideas and assumptions; 2) recognition of a historical or social context; 3) an examination of the context; and 4) deep reflection. (adapted from Moon (2008)) These capabilities interact with the four key concepts of media literacy (adapted from Buckingham (2003)): **Production:** 1) what technologies are used; 2) who makes news; 3) how values are related to ownership and control; 4) how texts reach their audiences. **Languages:** 1) how media use different forms of language to convey ideas or meanings; 2) how the grammatical 'rules' of media are established; 3) the effects of choosing certain forms of language; 4) how meaning is conveyed through the combination or sequencing of images, sounds or words. **Representations:** 1) what is included and excluded from the media world; 2) whether media texts support particular views about the world; 3) how media represent particular social groups; 4) whether media representations affect our views of particular social groups or issues. **Audiences:** 1) how media try to appeal to them; 2) how the media speak to audiences; 3) how audiences use media in their daily lives; 4) how audiences interpret media.

In the initial phase, the teacher asked students, 'How important is reading or watching news to you? Can you think of any pros and cons of reading or watching news? ' These questions led to the background concepts of newsworthiness including the significance of news lying in the number of people affected and how close the event is. These concepts were connected with each of the afore-mentioned topics in relation to which various cases were presented to students. In probing advertising in news media, for example, the female image in news media might

promote the sales of cosmetics or surgery, which could be extended for students to study stereotype at the later stage. During the process of conducting PBL projects, the teacher provided news stories drawn from the Internet, television news and newspaper, facilitated students to analyse the effects from various perspectives such as popular culture and commercialisation and investigate according to production, languages, representations, and audiences. 'Why were the image, picture, and footage shown on television? Who were affected? How were they affected?' were questions which might help students to organise their thinking. Students were then required to narrow down the topics and identify their problems and learning issues, develop ideas for solutions, evaluate collaboratively with peers and the teacher, and present their solutions. Reflection from the teacher' feedback or peers' discussions for further refinement was continuous. The class schedule and activities are shown in Table 4.3.

Table 4. 3 Media literacy class schedule and activities

Weekly schedule	**Activities**
Theme one: News media and propaganda	
Week 1: Newsworthiness	Lecture + discussion
Week 2: 1. Breaking news— introduction 2. News and propaganda— case discussion	Lecture + discussion Students started to practise identifying the problem of the cases.
Week 3: English language newspapers and news sources	Students established teams for conducting PBL projects.
Week 4: The secret language of headline and lead— the example of iPhone news	Students proceeded to conduct their first PBL presentation.
Week 5: 1. The body of news 2. Features and opinion articles	Students' first presentation and individual analytic writing + revision after the teacher's feedback
Week 6: The impact of technology	Students' second presentation and individual analytic writing
Week 7: Advertising	Students proceeded to conduct their third PBL presentation.
Week 8: Discussion over midterm projects	Students' third presentation and individual analytic writing + the teacher's feedback
Week 9: Midterm projects	Midterm group presentation and individual analytic writing + reflection on the teaching and learning process
Theme two: News media and views of the world	
Week 10: Media bias	The teacher reminded students of their previous limitations and the following PBL projects.
Week 11: 1. Conspiracy theory 2. McCarthyism and television	Students practised identifying problems and attempted to consider learning issues.

Week 12: Film discussion— *Good night, good luck!*	Students reflected on learning based on their life experiences related to television news and its responsibility.
Week 13: 1. Stereotyping 2. Reading discussion: *Freedom fighter or terrorist?*	Students' fourth presentation and individual analytic writing
Week 14: Students' talk show based on the topic of stereotyping	Students' talk show
Week 15: Cultural imperialism	Students' group discussions
Week 16: Media and globalisation	Students' discussions with the teacher
Week 17: A final check of the progress of students' final projects	Students proceeded with their final projects.
Week 18: Final projects	Final group presentation and individual analytical writing

As previously mentioned, students could freely choose any topics related to themes and issues to study, and the topics could be repetitive or about various dimensions of the themes. The learning topics the seven groups of students chose for presentation assessment are listed in Table 4.4.

Table 4. 4 Student' learning topics for presentation assessment

Theme one: ***News media and propaganda***	
Group work/ Group 1	**Topic**
1	Linsanity
2	Linsanity
3	Linsanity
Midterm	Racial stereotype
Group work/ Group 2	**Topic**
1	Show your beauty- cosmetic surgery
2	Show your beauty
3	The secret of cosmetics that women do not know
Midterm	The secret of cosmetics that women do not know
Group work/ Group 3	**Topic**
1	Controversy over importing American beef containing ractopamine
2	Controversy over importing American beef containing ractopamine
3	Students from Mainland China study in Taiwan
Midterm	Students from Mainland China study in Taiwan: the exchange
Group work/ Group 4	**Topic**
1	American beef and Ractopamine
2	American beef and Ractopamine
3	Air Force helicopter crash
Midterm	American beef and Ractopamine
Group work/ Group 5	**Topic**

1	Thousands march against nuclear power
2	Protesting river pollution in Sinpu
3	Goddess of the Sea— Matsu
Midterm	Taiwan, Independent or not
Group work/ Group 6	**Topic**
1	Controversial elements in Coca-Cola and Pepsi
2	U.S.-Korea Free Trade Agreement
3	The American beef
Midterm	The American beef
Group work/ Group 7	**Topic**
1	The conflict between the U.S. and Afghanistan
2	Coca and Pepsi change manufacturing process to avoid cancer warning
3	Nuclear terrorism— North Korea as a case
Midterm	Coca and Pepsi change manufacturing process to avoid cancer warning
Theme two: ***News media and views of the world***	
Group work/ Group 1	**Topic**
4	Gender bias
Final	McDonald's and cultural imperialism
Group work/ Group 2	**Topic**
4	The price bias of Starbucks coffee
Final	Coca Cola and globalisation
Group work/ Group 3	**Topic**
4	Social stereotype: a case from a traffic accident
Final	McDonald's and globalisation
Group work/ Group 4	**Topic**
4	Same-sex marriage
Final	Apple company and cultural imperialism
Group work/ Group 5	**Topic**
4	Sexism
Final	Globalisation- Korea penetrates the world
Group work/ Group 6	**Topic**
4	Outrage over 'disturbing' curvy LEGO's for girls
Final	The craze for Lady Gaga
Group work/ Group 7	**Topic**
4	Blind Chinese rights activist Chen Guangcheng expects to study in the U.S.
Final	Media bias and stereotype of China

Each of the topics was subject to one learning spiral of knowing-reflecting-stretching and one cycle of the teachers' scaffolding model. Following each group

work, the teacher gave the evaluation and comments to students, and students could further exchange ideas for modification or refinement with the teacher, either through the online e-course or face-to-face discussions. The evaluation criteria in this class were based on the critical thinking epistemological threshold framework affiliated with the critical components in the media field.

4.5.2 Assessment in the Media Literacy Classroom

Kipping (2000) argues that critical thinking is integrated with four main components in media: questioning assumptions, detecting bias, analysing context, and seeking alternative points and sources of information. On the basis of the critical thinking epistemological threshold framework with four conceptual and practical developmental stages developed in Chapter 2, the four components are interconnected with four key concepts of media literacy: production, languages, representations, and audiences (Buckingham, 2003) to formulate the critical thinking capabilities rubric for class assessment, as presented in Appendix B.1. The design of this rubric was more suitable for assessing students' writing assignments and thus aimed at evaluating students' individual writing. For group presentations, students' capability demonstration in response to twenty evaluative items was assessed according to the scale from zero to five points in Appendix B.2. The group presentations and individual writing assessed according to the rubrics were outlined as in Section 3.4.3 of Chapter 3.

Critical thinking is an ongoing process rather than a recognisable outcome; measuring critical thinking is thus difficult because **'**evaluating students' critical thinking is a critical thinking activity in itself' (Wright, 2002, p. 99). The course objectives and content direct assessment, while assessment may drive learning. Students should be engaged in the assessment process aside from the judgement made by the teacher. Assessment in the media literacy classroom, then, consisted of students' self-reflection and group reflection incorporated in their weekly journals and group discussions in addition to the teacher's evaluation.

Students' self-reflection was involved for students to learn metacognitive skills which helped them to make judgements and think of how to do better next time, while group reflection assisted students in learning standards of work for constructing meaning. Students' academic scores in the media literacy class were subject to the epistemological, practical, and ontological development, whereas their perceptions of change might become apparent from the records in their learning journals as well as the findings gathered from multiple methods which will be specified in the following chapter.

4.6 Summary

This chapter introduced the concept of media literacy, the internalised quality encompassing critical knowledge and capabilities rather than a set of mechanical skills and identified critical thinking as a threshold concept in this context. Some authors see media literacy as a means of achieving the goal of critical thinking (Arke & Primack, 2009), but this study emphasises that critical thinking is the integral part of media literacy in the learning process. Media literacy and critical thinking are both processes with layered outcomes; in implementation through PBL, the teacher's continuous adjustable facilitation according to students' increasing sophistication was thus of concern. The ongoing assessment involving the teacher's and students' perspectives was also paid attention in response to the shifting learning patterns.

Chapter 5 Methodology

5.1 Introduction

The main thrust of this study was to investigate students' perceptions of their learning experiences of critical thinking in the transformative journey and how PBL contributed to the attainment of critical thinking in the news media literacy context. To this purpose, classroom action research was conducted because it supported the implementation of PBL in the media literacy class where the teacher and students were engaged in collaborative learning. This chapter outlines the rationale for classroom action research and the models, the limitations and triangulation, the research design, and the actual undertaking in the classroom. In action research, students were expected to be not only the target to be studied but participants in the process, and the teacher and students took part in developing an idea, identifying the problem, and evaluating the effect. The actual research process, however, might be directed more by the teacher-researcher rather than by all of the participants because the teacher's multiple roles as the instructor, facilitator, and researcher had an impact on students' examination of the action research agenda. The teacher-researcher thus identified the agenda by incorporating students' opinions and encouraging them to participate through a variety of methods. Considering variations in learning, the teacher-researcher observed their differences through data collected from focus group interviews, questionnaires, and the teacher's observations, together with group and individual students' PBL tasks and weekly journals. As action research is contributive to self-assessment, the teacher was required to be critically self-reflective when examining students' transformation.

5.2 The Rationale for Action Research

Action research, as the name suggests, is about taking action and doing research. It can be useful for solving a problem and improving practice in the classroom-based settings. It starts from action and yields new action; in the process, research is necessary to collect and analyse data, reflect on the findings, and modify the

action, analogous to ‘systematic self-critical enquiry’ (Stenhouse, 1981, p. 103). The initial action, however, is not unplanned doing. Kemmis (1993, p. 178) considers action research to be a spiral of cycles of ‘planning, acting, observing, and reflecting’. Different from Lewin’s (1946) technicist view of action research, he argues that educational science based on practice must reject notions of ‘rationality, objectivity, and truth’, and action research is accordingly self-reflective enquiry referring to the study of praxis whereby the action researcher as the practitioner researches into his/ her own practice (Kemmis, 1993, p. 179). Macintyre (2000, p. 1) also presents a cyclical reflective process encompassing ‘the general idea of research topic and context, planning the action, refining the topic, evaluating the process, scanning the literature, considering different strategies, and taking action’. O’Leary (2004, p. 141) defines the process altering between action and critical reflection as ‘strategic action plan, action in implementation, observation by collecting data, and critical reflexivity’. The argument for reflexivity is echoed by Somekh (2006, p. 6) emphasising that action research ‘integrates research and action in a series of flexible cycles’. Reviewing a variety of definitions, Koshy (2005, p. 9) describes action research as ‘a constructive enquiry, during which the researcher constructs his or her knowledge of specific issues through planning, acting, evaluating, refining, and learning from the experience’ and reminds that following any particular model rigidly could jeopardise the emerging nature and flexibility of action research. The models previously presented share common elements and thus can be condensed into four essential steps: planning, implementing, analysing, and reflecting, suggesting the emergent nature of action research where ongoing cycles are involved. Action research brings about change through iterative implementation, and the continuing process implies that action research implementation is unlikely to be linear and fixed. The researcher found this planning-implementing-analysing-reflecting model helpful because it offered simple steps allowing for flexibility for the researcher and participants to operate with adjustment according to the real situations.

Echoing Elliott's (1991) argument that theories are validated through practice, Avison, Lau, Myers, and Nielsen (1999, p. 94) maintain that 'action research combines theory and practice (and researchers and practitioners) through change and reflection in an immediate problematic situation'. Somekh (2006, p. 1) notes the diagnosis of the problem context for change and writes that 'action research combines research into substantive issues with research into the process of development in order to deepen understanding of the enablers of, and barriers to change', according to which respecting the other participants' values and assumptions is required. Through the interwoven process of action and refinement, 'solving a practical problem' and 'producing guidelines for best practice' as the intention of action research is expected to be achieved (Denscombe, 2010, p. 6). Action research revolves around a critical process of enquiry which is collaborative and self-reflective in a context where the quality of teaching and learning is evaluated, denoting that the teacher's and students' involvement in the collaborative work and considering individual students' ideas are of concern.

The participatory nature of action research has been widely recognised (Kemmis & McTaggart, 2007; Koshy, 2005; Somekh, 2006); this study, though, was more adhered to classroom action research directed at addressing the problem context under the teacher's control through 'the teaching strategy, student assignments, and classroom activities' (Mettetal, 2012). Klein (2012, p. 3) describes teacher action research as 'self-initiated research' focusing on pedagogy and curriculum in classroom settings. Referring to PBL as a constructivist pedagogical approach used in this classroom research, Fried and Associates (2012) indicate the differences between positivist and constructivist approaches and suggest their opposing utility of numerical data and anecdotal data in understanding students' experiences and the difficulty in compatibility. What is perceived as rigour and validity founded on positivist standards appears to be unlikely applicable to action research. O'Leary (2010, p. 5), though, deliberates that the competing positions between the positivist view and post-positivist perspective under which social constructivism falls hinge on their different conceptions of ontology referring to 'what exists or what is real' and epistemology focusing on 'rules for knowing'. The distinction between the

positivist paradigm and post-positivist framework recognising the indefinite complexity of knowing may constrain researchers' 'ability to think and act reflexively' because their assumptions of knowing may not fit neatly into either approach (O'Leary, 2004, p. 57). Under the purpose of quality enhancement, action research projects sharing elements of different paradigms do exist, attributed to the extent to which quality schemes can fit in with the characteristics of particular types (Kember, 2000). Given that critical thinking was aimed to be developed and difficult to be measured without insight into students' transformation, qualitative data from focus group interviews, journals, and the teacher's observations in association with quantitative data from students' academic development based on the critical thinking capabilities rubric (Appendix B) and responses from questionnaires were more suitable for the purpose of this study.

As established, the key words residing in action research are practice, change, and reflection, indicating that action research is a pragmatic-oriented innovation. The status of the process tends to outweigh that of the outcome; nevertheless, this tendency does not mean that the outcome of research is not of significance. The inextricable link among 'processes, outcome and application' in action research is put forward by O'Leary (2004, p. 139). Koshy (2005) also portrays action research as purposeful research enhancing relevance and application in practical contexts. In reference to this study, the attainment of critical thinking in the media literacy class through PBL was the expected outcome, and action research was the means to observe students' development during the process. This study, though, intended to explore the effect of PBL on developing critical thinking rather than test the effectiveness of PBL in promoting critical thinking and thus was motivated more by the process than by the outcome. Action research in this study was carried out by the teacher-researcher in collaboration with students in the hope of revising the working relationships between the teacher and students in the explorative journey. The researcher concentrated on researching into her own practice, reflecting on the process, and modifying the action. As such, this study was practical, transformative, and reflective, attuned to the central spirit of action research.

In synthesising the above discussion, for this study, classroom action research refers to:

1) a dynamic framework of ongoing flexible cycles involving planning, implementing, analysing, and reflecting;
2) a quality enhancing project not limited to qualitative data;
3) a purposeful process which is practical, transformative, and reflective;
4) context-oriented research where the teacher and students work collaboratively to investigate the problem context despite that the teacher takes the lead.

5.2.1 The Teacher as a Reflective Researcher in Action Research

Action research plays an integral part in teachers' professional development through reflection on their own practices (Baumfield, Hall, & Wall, 2008; Carr & Kemmis, 1986; Elliott & Adelman, 1975; Elliott, 1991; Hopkins, 2008; Koshy, 2005; Stenhouse, 1975, 1981). Among the proponents, Stenhouse (1975) paves the way for supporting the integration of teacher and researcher. He advocates the relevance between research and classroom practice sufficing for curriculum development and evaluation and distinguishes teacher researchers from professional researchers endeavouring to 'master and scrutinise the material for general trends' (Stenhouse, 1975, p. 157). He explains that teachers can be more involved in practice than professional researchers who keep practice at a distance (Stenhouse, 1981). Elliot (1991, p. 54) also conceives teaching as 'a form of research aimed at understanding how to translate educational values into concrete forms of practice'. Undertaking action research with over 40 school teachers under the Ford Teaching Project from 1973 to 1975, he gave impetus to classroom action research and argued for the inseparable relationship between teaching and educational research which were 'integrated conceptually into a reflective and reflexive practice' (Elliott, 1991, p. 30). He maintains that collaborative classroom enquiry attempts to promote self-reflection through which students' perceptions of classroom pedagogy are investigated, and teachers can be committed to exploring their own classroom practices. The value of teacher as researcher in action research is echoed by many authors. For example, Hopkins (2008, p. 40) contends that any

curriculum research and development is founded on 'the study of classrooms' and hence leans on 'the work of teachers'. Baumfield, Hall, and Wall (2008, p. 3) indicate the interrelationship among policy, theory, and practice and maintain that the interaction of theory and practice rests with the teacher's professional 'engagement in researching into teaching and learning in their own classrooms'. The literature raises two issues for the teacher-as-researcher to cope with in putting research into practice: the classroom collaborative dynamics and the risk of the teacher's personal bias.

It appears to be taken-for-granted that classroom action research guided by the teacher in collaboration with students should result in a bank of rich ideas dedicated to the improvement of teaching and learning or development of curriculum. The reality might not be so straightforward because of the dynamic relationship between the teacher and students. Webb (1996) argues that action research entails group work, yet whether it should be collective is open to debate because it is far more likely to assume that each participant contributes to the project on an equal ground. The conflict between various participants may occur in the research process (O'Leary, 2004). The tension was not expected to be completely eliminated in this action research project. How the students responded to the dynamics between teaching and their learning, rather, was one of the questions being investigated through multiple data-gathering in the learning process involving students' 'troublesome diversity' arising out of the exploration of their prior knowledge, subject knowledge, and knowledge of themselves (Zull, 2012, p. xii). Instead of imparting knowledge, the teacher created opportunities for students to learn and then reflected on the practice through repetitive experiences bringing on new understandings of uncertain situations, referring to reflection-in-action (Schön, 1995). The teacher thus had different facets closely applied to the methodology of this study: 1) an action researcher examining the effect of PBL on critical thinking in media literacy class, 2) a facilitator helping students' development, and 3) a 'reflective practitioner' observing, evaluating, improving, and reflecting on the practice in the process of achieving self-knowledge (Schön, 1995).

The teacher-as-researcher is engaged in the research process as a practitioner; it may not be unreasonable to infer that the teacher has access to the research intent and understands about the situation being studied. This inference runs the risk of ignoring the possibility of personal bias which might place constraints on observing the wider context. Notwithstanding Stenhouse (1975, p. 157) places value on 'self-critical subjective perspective' rather than 'unattainable objectivity', supporting that educational research should be taken as a transformation of teaching instead of an activity added on to teaching, Hammersley (1993) defends the value of conventional research undertaken by professional researchers and suspects the proposal of integrating the role of teacher with that of educational researcher. This study recognises the importance of traditional educational research but holds a more positive view about the contribution of the teacher-as-researcher. As Hammersley himself (1993, p. 219) indicates, different weights of different positions depend on 'the particular circumstances and purposes of the research'. The value of teacher-as-researcher cannot be undermined though the discrepancy between the academic interests and practical concerns does possibly exist. This discrepancy does not mean that the combination of teacher and researcher is impossible, on the principle that the teacher understands the research disciplines for professional development or class quality improvement and recognises the risk of personal bias overriding different perspectives. This combination allows for trying out theories in real situations on the basis of which new meanings can thus be constructed.

5.2.2 Validity in Action Research

The issue of validity in action research arises out of the previous discussion. From the teacher-researchers' perspective, Stenhouse' (1975) and Kemmis' (1993) arguments serve as a useful background. Stenhouse (1975) contends that all research involves personal values and beliefs and is thus unlikely to achieve absolute objectivity. Kemmis (1993) also proposes that the action researcher is bound to the dialectical process of critical self-reflection. His argument suggests that the rigour of doing action research lies in adhering to action and reflection rather than validity as 'accuracy' and reliability as 'replicability' (Winter, 2000).

Action research centres on appropriateness of methods and systematic accounts to interpret the findings. Validity in action research, then, tends to rest on meaning and inferences drawn from data rather than rigorous methods (Cohen et al., 2007). However, this does not necessarily mean that action research rejects the significance of validity and generalisability. Hopkins (2008, p. 141) regards internal validity concerning the soundness of explanations as the basic minimum for classroom research and argues for reliability concerned with 'consistency' and 'generalisability'.

Since action research occurs in classrooms within particular fields, it may be criticised owing to the ignorance of the broader educational and social changing context (Kemmis & McTaggart, 2007). Action research, in this sense, does not appear to address the issue of generalisation. This study counters this claim. While teachers-as-researchers may be restricted to their own contexts, as previously argued, their experiences used to evaluate and reflect on the happenings in the classroom can be of more value, contributing to communications with other similar settings. Without taking actions in the classroom as the foundation, the power of educational research for transformation is unlikely to be developed. The classroom is embedded in the wider educational and social circumstances as an epitome of a society, to some degree. The broader environment interacts with the particular context and thus requires the accumulation of experiences from various groups of people to embody its content. Action research should by no means be distanced from widening its applicability and conducted in isolation (Elliott, 1991; Klein, 2012). On the contrary, different teachers involved in classroom research can accumulate a rich stock of strategies for those in similar contexts to further select, evaluate and reflect (Macintyre, 2000).

Campbell and Fiske (1959) believe that triangulation is a powerful way of demonstrating validity in research and can be applied to pondering its reliability. Triangulation contributes to the improvement of research quality (Mathison, 1988), the reinforcement of confidence in the evaluation findings (Bryman, 2004), and a rich illustration of the research problem ascribed to divergent results from mixed methods (Jick, 1979), and the convergence of results to establish validity (Drisko,

2011). This study adopted Denzin's (1978, p. 302) idea of the methodological triangulation referring to using multiple methods of gleaning data for validation and between-method strategies of contrasting research methods because 'the flaws of one method are often the strengths of another, and by combining methods, observers can achieve the best of each while overcoming their unique deficiencies'. His contention has prompted resonances from Cohen et al. (2007, p. 149) arguing for 'an eclectic use of instruments', Maxwell (2013, p. 128) advocating 'a better assessment of the generality of explanations that one develops', and O'Leary (2004, p. 58) considering justification for the researcher's 'subjectivity with transparency'. It appears to be sufficiently legitimate to adopt triangulation to enhance the trustworthiness of research in support of avoiding the obtrusion of one point of view; however, Jick (1979) stresses the holistic or contextual portrayal of the studied to illuminate deeper understandings. Mathison (1988, p. 15) also encourages researchers to contemplate the possible 'convergent, inconsistent, and contradictory' outcomes from different data for holistic understandings of specific phenomena, for different understandings might arise from different methods and how these differences are reconciled should be addressed. In triangulation, not each method is equally situated (Bryman, 2004), yet the researcher still needs to endeavour to illuminate how triangulation works. In consideration of enquiry into 'student-centred', 'teacher-classroom, and 'instructional development' issues (Klein, 2012, p. 2), the researcher observed multiple events related to the studied, reviewed and reflected on the materials collected. These multiple sources and approaches provided a rich resource for constructing adequate accounts and understandings fundamental to working towards the resolution of research problems. Qualitative methods of focus group interviews were employed to investigate their learning experiences and difficulties, including the cognitive, affective and social dimensions of learning. Quantitative data were used to understand students' critical thinking development in academic performance, with their responses from questionnaires to probe their perceptions of development. The teacher' observations then drew forth students' learning pattern. In the hope of explaining the complexity of students' reactions from more than one perspective, the two methodological camps could either converge or contradict each other, but

above all, the effect of brightening the context and giving a richer account is worth deeper exploration. These methods were associated with students' individual writing tasks and group presentation projects completed in the PBL process to strengthen the richness of analysis. Integral to action research is a self-reflective spiral of cycles of planning, implementing, analysing, and reflecting; two cycles of research were conducted to validate the findings and examine the transformative process. Different perspectives from various data sources at different times were therefore useful.

5.3 Research Design

The design of action can be adjustable according to actual needs without jettisoning other kinds of methods that may be of use. This flexibility corresponds to the purport of this study which was not inclined to espouse any theoretical or methodological extremes. This study accepts the pragmatic view of 'what works' contending the possible compatibility between qualitative and quantitative methods (Denzin & Lincoln, 2011, p. 2) because action research recognises multiple realities of knowing, considers different perspectives, and allows space for the researcher to choose the fitting methods to illuminate the particular context. Denscombe (2010, p. 9) argues that research design should embrace: 1) the suitability concerning appropriate data to answer research questions; 2) the feasibility of research, including access to data resources in particular contexts, time management of conducting the project, and a preference to certain types of research in the particular research community; and 3) ethics in dealing with participants. These issues will be tackled in the subsequent sections. To put it in a nutshell, the design of this study includes the following elements:

- Action research as the methodology providing the framework for research
- Focus group interviews, questionnaires, and observations as techniques
- Questionnaire responses to open-ended questions, interview responses, observation field notes, and the teacher's and students' journals as qualitative data

- Questionnaire responses to closed questions and students' academic performance marks in the PBL process as quantitative data
- Qualitative content data analysis (Schreier, 2012) and thematic analysis of qualitative data
- Quantitative data analysis based on descriptive statistics and inferential statistics including correlations and t-tests (Cohen et al., 2007)

The research design was integrated with PBL in the media literacy context and required the teacher's intervention to facilitate students to go through the process. Intervention activities divided into three parts were reviewed in conjunction with the teacher's field notes of the students' development in class. The first part was the reminders and weekly learning materials posted on the e-course online system, enabling them to be constantly aware of what they were expected to learn. The second was the teacher's comments on the students' group and individual tasks which were returned to students after each assessment. Students' perspectives of learning were recorded as feedback in their weekly journals, according to which the teacher made corresponding adjustments in class.

5.3.1 Research Methods for Answering Research Questions

The research questions, explored in this thesis, are listed below:

1. How did the students experience their learning of critical thinking in media literacy in the PBL process?

    1.1 In what ways did they think PBL contributed to their development of critical thinking?

    1.2 What did they consider to be the difficulties and problems in learning?

2. How did students' critical thinking shift?

    2.1 What, if any transformation occurred in students' academic performance?

2.2 How did their understanding of critical thinking and critical thinking capabilities in media literacy develop?

3. How did PBL relate to the development of the teacher' facilitation of developing critical thinking?

The first question concentrates on the affective and social aspects of learning experience associated with their perceptions of cognitive development; the second centres on students' epistemological development, whereas the third highlights the practical domain of teaching. Under the first and second main questions, two sub-questions are respectively included to look at specific dimensions which are then reconciled for answering the main research questions. The first main question focuses on students' learning experiences which were articulated in focus group interviews. Recognising that some students might be reluctant to express their real ideas in the public occasions, the researcher also drew on their writing of what they learned and experienced in the class from their weekly journals. In answering Question 2.1, providing that students' transformation in thinking was measured according to the critical thinking capabilities rubric based on the critical thinking epistemological threshold framework from the absolute-subliminal status to the contextual-postliminal stage (Appendix B), their manifestation of critical thinking capabilities inevitably involved numeric data. These data were complemented by the teacher's class observations recorded in field notes in acknowledgement of the possible inconsistency between what was assessed and what was observed. To cross-check the data findings, students' responses to their critical thinking development from questionnaires were further incorporated. The third question, by contrast, is more inclusive and reflective because it centres around how the teacher' facilitation of developing critical thinking worked from the students' perspective and the teacher's reflexivity throughout the teaching journey. Students' qualitative change and academic performance were thus taken as the basis for the examination of the teacher's facilitation in the class. The data were mainly drawn from the teacher' weekly journals, together with relevant parts of all the methods previously mentioned. The teacher-as-researcher presented and interpreted various data by referring back to the findings from answering the preceding research questions to

avoid the researcher's subjective distortion. A student who kept in contact with the teacher after the end of the media literacy course also voluntarily provided his follow-up feedback although his opinion was not treated as formal verification of the findings from other data in answering the last question.

5.4 The Actual Undertaking of Action Research

The literature suggests that the process of action research stems from a problem to solve or a context to explore (Denscombe, 2010; Hopkins, 2008; Koshy, 2005; Macintyre, 2000; Mettetal, 2012; O'Leary, 2004). This research started from the problem that whether critical thinking could be developed through PBL and aimed to explore how PBL contributed to the attainment of students' critical thinking in the media literacy class. In response to the spiral cycles of action research, the teacher-researcher planned the course by incorporating students' opinions and identified what they thought of the current news media and what they knew about the two themes: *news media and propaganda* as well as *news media and views of the world* (Appendix A). Entering the implementing phase, the teacher facilitated students to develop critical thinking by offering a variety of topics and materials and observed their learning. Students participated in choosing the topics they were interested in, searching for relevant information, and embarking on their projects of analysis and reflection. With the presentation of each of their six projects, as shown in Table 4.3 of Chapter 4, the teacher conducted preliminary collation to identify their periodic learning achievement. The reflection on the teaching and learning process was written in the teacher's and students' weekly journals. The flow of the cycle was not necessarily linear but intertwined. Although the research only consisted of two cycles due to time constraint, the undertaking of each of students' projects for presentation could be regarded as a new round under these cycles, in which the four interwoven steps were involved (Figure 5.1).

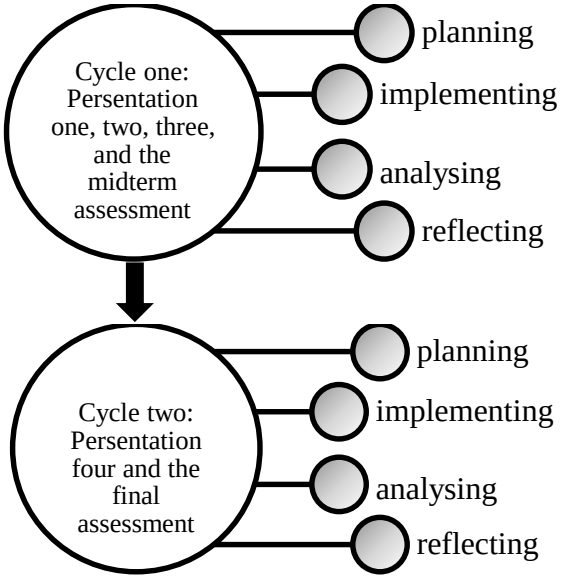

Figure 5. 1 Conceptual framework for the action research undertaking

5.4.1 The Setting

The teacher-researcher had taught courses in the media field for English language majors in the private comprehensive university in Southern Taiwan since September 2007 and was thus confident of operating the curriculum. This university is one of the 161 higher education institutions in Taiwan, among which a number of universities and colleges have English departments with different focuses or specialties. Starting from supplying general English language courses, every English department in the higher education institutions has offered a wide range of curricula aiming to help students to develop their interests in related fields. Under the circumstances, in addition to the general English courses for students in the first and second years, the English department at the chosen university encouraged students in the third and fourth years to study courses in different areas by providing multi-dimensional curricula, including elective courses of media and communications. Because they were not unified required courses, teachers with particular expertise had more autonomy to develop their own teaching tactics and try out innovative strategies.

The elective advanced English course was open for juniors who finished the general English courses for the first two years, but seniors interested in learning

were also admitted. The teacher and students met once a week for two hours in a regular classroom equipped with a teacher's networked computer. The period of action research was undertaken for one academic semester lasting 18 weeks. The research was a good opportunity for the teacher interested in integrating critical thinking into English journalism or communications curriculum to look into the teaching, for this study not merely pointed at investigating students' critical thinking in the news media literacy class but also attempted to contribute to the teaching practice in this context.

5.4.2 The Procedure

Pilot study was conducted in the first semester from September 2011 to January 2012 in another news media literacy class with a similar context, whereas the real undertaking was carried out in the second semester including 18 weeks from February to June 2012. The pilot study was put into practice in the *News Writing* class with 15 English majors in a Southern Taiwanese university of languages to improve the data-collecting plan for methodology and have a deeper insight into the research topic. Regarding the transformation in students' critical thinking, it was found from the pilot study that in the midterm formal assessment, 5 students remained at the absolute-subliminal stage, 7 students were at the transitional-preliminal stage, and 3 students were at the independent-liminal stage. In the final assessment, 8 students stayed at the transitional-preliminal stage, and 7 students moved up to the independent-liminal stage. From students' responses, guidance on clarifying the key concepts, how to proceed with the PBL process, and the criteria of evaluation and assessment could be helpful. After referring to students' feedback and the researcher's own field notes in the pilot study, the weekly teaching schedule for the formal target class was modified and planned again, aiming to provide students with better understanding of the importance of critical thinking in media literacy through analysing messages hidden behind current events of different topics from different news media and perspectives. During the period of the formal research, the teacher-researcher's field notes and journals were recorded to reflect on the process of teaching, together with ongoing data collection, collation and analysis (Table 5.1).

Table 5. 1 The timetable of action research

Time	September 2011~ January 2012	February 2012~ June 2012	July 2012~ March 2013	April 2013~ August 2013→
Study	Pilot study	Actual undertaking of action research	Preliminary analysis	Data coding and analysis
Work	Conducting, reflecting, and modifying the plan for actual undertaking	Ongoing planning, implementing, analysing, and reflecting	Collating and organising data collected	Coding interview data and analysing numeral data

5.4.3 Sampling

Sampling in action research is not directed at being representative of the larger population and is thus more purposive with a focus on the research (Punch, 1998). This classroom action research was conducted with a class of 35 Taiwanese undergraduates majoring in English and taking the one-semester elective media course entitled *News editing and interpreting* in the Applied English department of a Southern Taiwanese university. The students were mostly in their third year during the data collection semester, involving 29 juniors and 6 seniors. Their age ranged from 21 to 23, with 29 female and 6 male students. The 35 participants were divided into seven groups, among which there were 6 members in group two, 4 members in group four, and 5 members in the rest of groups, by choice.

As the course was elective, students chose it by free will. According to their responses from the midterm focus group interviews, the researcher categorised the following four reasons for the choice: 1) the habit of reading news regularly; 2) curiosity to know news inside stories; 3) the wish to learn more about English language skills of reading and writing; 4) the willingness to learn how to analyse news issues; 5) usefulness for their future jobs. Among the 35 students, only 2 students explicitly stated that they intended to explore the concept of critical thinking. In spite of these different reasons, they were somewhat motivated and interested in taking part in this course.

5.4.4 Ethical Concerns

Miles and Huberman (1994, p. 34) remind that the ethical issues of sampling hinge around 'informed consent, potential benefits and risks, and the relationship with informants'. To minimise the risk of harm participants might suffer, Denscombe (2010, p. 7) provides a guiding list in response to which the researcher must 'act professionally and with integrity' and consider:

- Participants will remain anonymous;
- Data will be treated as confidential;
- Participants understand the nature of the research and their involvement;
- Participants voluntarily consent to being involved.

Given that the participants were a group of students taking the teacher-researcher's course, it appears to be taken-for-granted to postulate that they should be included in this classroom research. In order for the research sample not to be abused, however, the researcher clearly stated the purpose of this research embedded in the course, the procedure, how they would be involved, and how the data would be treated at the very beginning of the course. All participants were confirmed that they had the equal right to be informed, to participate in any decision making directly related to them, and to withdraw from the research. In the first class, consent forms with information about ethics were delivered to students to fill in with the 100% return rate meaning that all the 35 students were unanimous in regard to participation in research (Appendix C). In the process of data collection, students' data were kept confidential, and withdrawal from the research or refusal to answer any research question did not affect them in any way. In presenting the data, they were given pseudonyms. Furthermore, because video recording was used in focus group interviews and class discussion, students were also informed that the recording remained confidential.

5.5 Data Collection

Action research presents a set of procedures through which various techniques for collecting data can be used. Students' academic performance marks were naturally occurring data in the PBL classroom, and the teacher-researcher supplemented the data with other types such as focus group interviews, questionnaires, and the teacher's observations as the defined area dictates (Mills, 2014). As mentioned, multiple data collection methods were employed: focus group interviews, questionnaires, and the teacher's observations associated with students' weekly journals, individual written tasks, and group presentations collected from the PBL process. Both qualitative and quantitative instruments were used in the hope of increasing validity. Perceptions were elicited through focus group interviews, questionnaires, and students' journals. Concrete evidence was discovered through students' written assignments and group projects from the assessment procedure. Outcomes were expected to be apparent through the teacher's observations. The schedule of data collection in response to the PBL process is shown in Appendix D.

5.5.1 Focus Group Interviews

Focus groups defined by Punch (1998, p. 177) is group interviewing which is a more general term used to describe its discussion nature; the researcher as 'the moderator or facilitator' thus plays a significant role in assisting in the group interaction. Drawing on Bedford and Burgess's (2001, p. 121) definition of a focus group 'as a one-off meeting of between four and eight individuals who are brought together to discuss a particular topic chosen by the researcher(s) who moderate or structure the discussion', Hopkins (2007) further reminds that the context affecting the discussion is worthy of concern. Cohen et al. (2007) argue that the data emerging from group interaction yields insights that might not have been available in a straightforward interview, but the emphasis on collective activities may by contrast result in the discomfort of sharing ideas with group partners in public places (Morgan, 2013).

The researcher used focus group interviews as the term because it reflects the nature of the technique. Two semi-structured interviews were undertaken after students' midterm and final group presentations. Each of them ran for about four hours, in which each of the seven groups spent approximately 40 minutes expressing their opinions. They were asked the reason for taking this course and general perceptions of the PBL curriculum at first, and then more specific questions in terms of learning and teaching were raised. They finally concluded whether critical thinking they learned in class could be useful for their life (Appendix E). Although the organisation tended to be structured, students were free to articulate any relevant ideas in the process. Concerning the problems associated with group dynamics between group members and the teacher-researcher and students, focus group interviews were used with other kinds of methods. With the emphasis on their perceptions of learning experiences, students might feel more comfortable with expressing opinions in their individual journals. This did not diminish the value of focus group interviews; rather, the teacher-researcher tried to build rapport with students at the beginning of the course and a relaxing environment of talking to ease the tension between all the participants. Videotaping and the teacher's note taking were also involved to capture details which might be ignored in other methods, and students were notified of the procedure before the undertaking.

5.5.2 Questionnaires

With adherence to the whole research design of investigation, questionnaires are not merely a list of questions emphasising a perusal of the wording (Oppenheim, 1992). As Punch (1998, pp. 102-103) states, 'questionnaire will seek factual information and will also include measures of attitudes, values, opinions or beliefs'. Questionnaires are often used in a combination with other methods to eschew the criticism of lacking in concern of the social context or the risk of the low response (Oppenheim, 1992). Referring to this study, there were pre-class questionnaires and post-class questionnaires with closed questions based on Likert scale format to retrieve quantifiable information in conjunction with open-ended questions to further understand the quantitative data. The pre-class questionnaire concentrates on critical thinking in media (Kipping, 2000) and learning issues of

media literacy (Buckingham, 2003) to gather preliminary information about students' knowledge, whereas the post-class questionnaire includes the aforementioned as well as reflections on the PBL pedagogical approach. Questionnaires with questions from the general to the specific were designed to discover students' cognitive and behavioural information (Appendix F). The design of both questionnaires required pilot testing in which the researcher went through the aforementioned 15 students who were typical of the studied to check the actual words to be used and the possible discrepancy between the meanings the students and the researcher gave to each item (Punch, 1998). The teacher-researcher negotiated with students to complete the questionnaires in class in the hope of ensuring higher response rates. In order to understand students' learning of critical thinking in media literacy in the middle of the research process, a midterm class survey was also used (Appendix G).

5.5.3 Observations

Classroom observations in this study were categorised as unstructured observation throughout the research process, three less structured observations on students' first three presentations in the first cycle and three structured observations on the fourth presentation, talk show, and group discussion conducted closer to the end of the course in the second cycle. This study referred to the five phases suggested by Silverman (1993): raising general questions at the initial stage, recording in field notes, observing by looking and listening, examining hypotheses, and making wider connections. At latter gradations when students were expected to be more sophisticated towards critical thinking, observation schedules concentrated on media production, languages, representations, and audiences (Buckingham, 2003) were developed to allow the structured approach to be adopted to observe focused units. The unstructured observations aimed to record the happenings in the classroom and note down key points about lessons in a general sense, including the classroom atmosphere and students' reaction to the teacher's remarks or questions. The less structured observations were based on Kipping's (2000) critical thinking components in media and Buckingham's (2003) media literacy key concepts, and structured observations with a more specific focus were used to validate data from

assessment and observation through a tally system of ticking every time a particular event occurs (Appendix H). For minimising the researcher's bias, the completed structured observation forms were given to students to review and provide feedback, if any.

5.5.4 The Teacher's and Students' Journals

The teacher-researcher and students kept their weekly journals after the class in each of the 18 weeks. The usage of the journals was to reflect on the teaching or learning content of critical thinking in media literacy and process rather than to merely record the events happening in the classroom and incorporated into the PBL process. For the teacher-researcher, the journals were distinguished from field notes written during or right after observations. The teacher's journals included what she did, how she interacted with students, and how students responded to the learning issues in the classroom and might hence capture the subtlety of teaching and learning. It was recognised that overlapping ideas might be found in field notes and journals, though.

For students, keeping the journals tended not to be as coercive as writing tasks. In the first cycle of the research, they were expected to reflect on their learning in response to critical thinking in media literacy; however, they were more apt to express their thoughts and feelings. Their reflection on learning experiences were thus drawn on for illustrating implicit messages from focus group interviews where students were not willing to expose opinions in public.

5.6 Data Analysis

Miles and Huberman (1994, pp. 21-22) describe the ongoing data analysis as 'data reduction', 'data display', and 'conclusion drawing/verification'. This research involved both qualitative and quantitative data and used different techniques to simplify and transform the raw data. Data from focus group interviews were analysed according to Schreier's (2012) qualitative content analysis. Provided that the interviews were not unstructured, the framework for analysis was established. The researcher referred to the method of summarising the relevant points of

students' opinions to answer the research question about students' perceptions of their learning experiences. Qualitative data from responses to open-ended questions in questionnaires were categorised as themes used to illustrate findings from other kinds of data.

Quantitative data were computer analysed with SPSS. Descriptive statistical analysis was used to calculate the means of students' academic marks. The t-test for paired samples was adopted to discover whether there were statistically significant differences between the means of the same student groups' midterm and final scores, as well as the same students' individual midterm and final scores. The Pearson product moment correlation was used to see whether those students who scored highly for group work also scored highly for individual writing. The percentage comparison was employed to analyse data drawn from students' responses to closed questions in pre-class and post-class questionnaires.

5.7 Merits and Limitations of this Action Research

Action research has resulted in wide use in various educational settings. As Klein (2012, p. 3) argues, 'action research has become a feasible way to not only examine what is, but to imagine what might be possible'. The researcher adopted this methodology as its essence corresponds to the purpose of this study, to investigate the development of students' critical thinking through PBL in the media literacy context. Action research revolves around the improvement in practice, which involves change, reflection and flexibility. The techniques employed in action research to answer research questions are not confined to particular types, and the implementing steps can be fluid, depending on actual classroom situations. All these advantages provide a useful background for the researcher to explore during the transformative expedition.

This research, nonetheless, was also confronted with some limitations. First, time constraint on conducting for 18 weeks appeared to be too intensive for the teacher-researcher to observe students' potential development in the longer term, given that critical thinking tends not to be explicitly measured. The time limitation was related

to the second difficulty in achieving sufficient respondent validation due to the teacher's and students' heavy workload in planning, implementing, analysing, and reflecting as well as lack of follow-up research on their ongoing transformation afterwards. The teacher was busy marking, while the students might have trouble negotiating with group members, searching for information, and organising their projects for presentation and writing tasks. Despite these limitations, whether PBL contributes to attaining critical thinking in media literacy is open to explore in the Taiwanese context. This study, above all, was undertaken in the hope of mobilising knowledge in practice and providing insight into the transformative learning journey in the media literacy context for pedagogical improvement.

PART II:

ANALYSES AND FINDINGS

Chapter 6 Results 1: How Students Experienced Their Learning of Critical Thinking in Media Literacy in the PBL Process

6.1 Introduction

This chapter centres on how students viewed their development of critical thinking through PBL in the news media literacy class. In order to answer the first research question about their learning experiences of critical thinking, midterm and final focus group interviews were conducted at the end of the first and second research cycles respectively. The interviews had two key dimensions: 1) the ways students thought PBL contributed to the development of their critical thinking, and 2) what they considered to be the difficulties and problems in learning. Topics discussed during the interviews include the reason for taking the course, perceptions of PBL, specific questions in terms of learning and teaching, and the usefulness of critical thinking for their life (Appendix E). Their responses were videotaped, transcribed, and analysed on the basis of qualitative content analysis (Schreier, 2012). Data were then coded and categorised to build a coding frame.

Students' perceptions expressed during the interviews were compared with those written in their midterm self-evaluation survey and weekly journals. This chapter has three principle sections: 1) the coding strategy, 2) findings from interview data grouped into three themes — impression of PBL, key features of PBL, and difficulties in learning, and 3) individual student' cases drawn from journals to illustrate their particular learning experiences.

6.2 Analysis Strategy

At the end of the first research cycle, the teacher raised questions about content knowledge in relation to critical thinking in the midterm survey for students to evaluate their learning (Appendix G). Their answers to the question about the effectiveness of PBL in helping to develop their critical thinking in media provided the context for the analysis of focus group interviews in particular. As Table 6.1 shows, 60% (21 out of 35) students praised positively the effectiveness of PBL.

These answers focused on two factors— teamwork and problem-solving reflecting the constructivist characteristics of PBL; however, they reported confusion pertaining to the complexity of applying critical thinking to deconstructing news media.

Table 6. 1 Students' responses to midterm survey question about the effectiveness of PBL in developing critical thinking

Question: Do you think it is effective in developing your critical thinking via PBL in relation to news media and propaganda? Why?			
Yes (n =21)	Students' responses	No (n = 14)	Students' responses
Category: Teamwork	1. Through brainstorming, I can think more deeply and widely. (brainstorming n = 3) 2. Everyone has his or her way of thinking, and we have a lot of ideas to learn. It's a challenge to everyone. (idea-challenging n = 4)	Category: Confusion	1. I don't understand it very clearly. (indefiniteness n = 7) 2. Not now. Because there is limited information in my brain, I can't use it to connect to news well. 3. I still feel a bit confused about what critical thinking is.
Category: Problem-solving	1. From thinking of the problem, I can search information and learn things more easily. (problem-analysis n = 3) 2. I will follow the question to develop my critical thinking. (questioning n = 2) 3. We find the problem from news and try to give the solution to it. (problem-solving n = 4)	Category: Others	News is just news. They are not related.

Given the established interview questions as shown in Appendix E and issues emerging from students' responses, this study adopted the combination of concept-driven and data-driven strategies. Students' answers might not really fit in with what questions aimed to ask; the dada of their responses to learning, teaching, and course expectations were summarised to obtain data-driven themes. Drawing on Schreier's (2012, p. 107) idea of 'progressively summarising' data, the researcher found it useful to refer to Hermann's (2010) four-level coding frame consisting of impressions subdivided into positive, critical, and neutral dimensions, constructive features, and difficulties at the first level. The researcher thus selected students' responses relevant to the research question, classified similar ideas into groups under labels, compared and generated emerging sub-themes under main themes,

and created a coding frame with definitions for themes, as presented in Table 6.2. This procedure was to avoid limiting data analysis merely to the agenda of the researcher (Ezzy, 2002). The data were coded with rules and structured by the researcher, and another colleague conducted the coding again. The inconsistency was approached by the researcher who recoded after six months. For how students thought of the contribution of PBL to their critical thinking, the two main themes were *impression* (coding no. 1) and *key features* (coding no. 2). Under *impression*, *positive* associated with *implementation*, *method*, and *practicability and usefulness*, as well as *critical*, and *neutral* emerged as sub-themes. Under the first theme— *impression→ positive→ implementation*, students responded to *stimulus for learning*, *positive interaction in teamwork*, and *improvement in knowing*. Under the same theme— *impression→ positive→ method*, students mentioned *various resources* in the midterm but *various activities* in the final, yet they also referred to *time limitation* and *the teacher's evaluation* as critical comments. Under *key features*, *problem-raising*, *problem-solving*, *analysis*, and *discussion* emerged as sub-themes in the midterm, while the sub-themes were reduced to *problem-solving* and *discussion* in the final. Under *difficulties* (coding no. 3) in learning, *complication* and *uncertainty* associated with *definition* and *direction* emerged as sub-themes in the midterm, and *unfamiliarity*, *disagreement in teamwork*, and *uncertainty* emerged as the sub-themes in the final. Students' responses were coded as units of coding based on their group numbers and the sequence of answers in the interview transcripts; for example, the first response in group one was coded as 1.1, and so forth. There were 138 units of coding relevant to the research question, including 60 units from midterm interview responses and 78 units from final ones. It is important to note that, however, not all sub-themes were evident during both interviews; the teacher-researcher interpreted students' responses according to the actual context with engagement in conversation. The overlapping ideas involved in sub-themes will be explored with students' cases.

Table 6. 2 Themes and subthemes from focus group interview responses

- Impression (coding no. 1)
  - Positive (coding no. 1.1)
    - Implementation (coding no. 1.1.1)
      - ❖ Stimulus for learning (coding no. 1.1.1.1) (*This applies if students thought that the course could stimulate their willingness or curiosity to learn more to enhance their criticality and consequently be helpful for their future*.): (Midterm units of coding 1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.4, 2.10, 4.1, 5.2, 6.3, 7.1) (Final units of coding 1.1, 2.13)
      - ❖ Positive interaction in teamwork (coding no. 1.1.1.2) (*This applies if students talked about the benefits of working with group members to develop critical thinking*.): (Midterm units of coding 2.14, 6.7) (Final units of coding 1.4, 2.8, 3.7, 4.6, 5.9, 6.5, 7.7)
      - ❖ Improvement in knowing (coding no. 1.1.1.3) (*This applies if students reflected on their improvement in abilities, including considering different perspectives, analysis, argumentation, deeper understanding, making judgements, or problem-solving*.): (Midterm units of coding 3.1, 3.2, 3.3, 3.5, 3.6, 4.5, 5.1, 5.8, 5.10, 6.2, 6.5, 6.6, 7.2) (Final units of coding 1.10, 2.3, 2.7, 2.11, 2.14, 3.2, 3.6, 3.10, 3.11, 3.12, 3.13, 4.1, 4.2, 4.3, 4.9, 5.5, 5.8, 5.11, 6.7, 7.1, 7.5, 7.6)
    - Method (coding no. 1.1.2)
      - ❖ Interest in the topics provided (coding no. 1.1.2.1): (Midterm units of coding 1.8, 6.1) (Final units of coding 1.6, 1.7, 2.5, 2.6, 3.5, 4.5, 5.6, 5.7, 6.2)
      - ❖ Various resources (coding no. 1.1.2.2): (Midterm units of coding 2.8, 2.9)
      - ❖ Various activities (coding no. 1.1.2.2): (Final units of coding 3.3, 3.14)
    - Practicability and usefulness (coding no. 1.1.3) (*This applies if students mentioned what was learned in this class was practical or useful for their real life*.): (Midterm unit of coding 2.5) (Final units of coding 4.4, 4.10, 5.12, 6.4, 6.8, 7.2, 7.3, 7.10)
  - Critical (coding no. 1.2)
    - Time limitation (coding no. 1.2.1): (Midterm unit of coding 1.6) (Final units of coding 5.3, 7.4)
    - The teacher's evaluation (coding no. 1.2.2) (*This applies if students talked about their uncertainty although they received the teacher's evaluation feedback*.): (Midterm units of coding 4.3, 4.7) (Final unit of coding 1.8)
  - Neutral (coding no. 1.3): (Midterm unit of coding 2.11) (Final units of coding 1.9, 6.1)

Midterm focus group	Final focus group
• Key features (coding no. 2) o Problem raising (coding no. 2.1): (Midterm units of coding 1.9, 5.6, 5.7) o Problem-solving (coding no. 2.2): (Midterm unit of coding 2.6) o Analysis (coding no. 2.3): (Midterm units of coding 3.4, 4.4) o Discussion (coding no. 2.4): (Midterm units of coding 1.10, 7.3)	• Key features (coding no. 2) o Problem-solving (coding no. 2.1): (Final units of coding 3.9, 4.7, 5.10, 6.6, 7.8) o Discussion (coding no. 2.2): (Final unit of coding 3.8)
• Difficulties (coding no. 3)	• Difficulties (coding no. 3)

○ Complication (coding no. 3.1) *(This applies if students mentioned that the process of studying was difficult because of complicated information*.): (Midterm units of coding 2.7, 2.13) ○ Uncertainty (coding no. 3.2) ▪ Definition (coding no. 3.2.1): (Midterm units of coding 1.7, 1.11) ▪ Direction (coding no. 3.2.2) (*This applies if students mentioned that they were confused about what topic they should choose, how to start, or whether they adopted the appropriate method.*): (Midterm units of coding 1.12, 2.3, 2.12, 2.15, 4.2, 4.6, 5.3, 5.4, 5.5, 5.9, 6.4)	○ Unfamiliarity (coding no. 3.1) (*This applies if students mentioned that the course was difficult because of some unfamiliar topics or terms*.): (Final units of coding 2.2, 3.1, 5.1) ○ Disagreement in teamwork (coding no. 3.2) *(This applies if students mentioned that it was hard to accomplish the task because of the difficulty in reaching consensus*.): (Final units of coding 1.3, 2.1, 2.4, 2.9, 2.10, 2.12, 3.4, 6.3) ○ Uncertainty (coding no. 3.3) (*This applies when students were not sure about what topic to choose, how to start, or which direction to take*.): (Final units of coding 1.2, 1.5, 4.8, 5.2, 5.4, 7.9)

6.3 Findings from Focus Group Interviews

The coding frequency matrices of the midterm and final interview data in response to the three themes— *impression*, *key features*, and *difficulties* are presented to compare students' responses at the end of the first and second cycles of action research. From the midterm interview responses, there were 37 units of coding under the first theme, 8 under the second theme, and 15 under the third theme. From the final responses, 55 units of coding were under the first, 6 under the second, and 17 under the third theme. The frequencies of students' responses under the same coding in the midterm and final focus group interviews varied. The complete midterm and final coding frames with students' responses are presented in Appendix I.

6.3.1 Theme One: *Impression* from the Midterm Focus Group Interview Data

Students' responses were divided into three parts— *positive*, *critical*, and *neutral* under which there were subsidiary sub-themes. The matrix is presented in Table

6.3.

Table 6. 3 Midterm focus group interview coding frequency matrix of theme one

T 1	Impression (1)	Impression (1)	Impression (1)	Impression (1)	Impression (1)	Impression (1)	Impression (1)	Impression (1)	Impression (1)
	Positive (1.1)	Positive (1.1)	Positive (1.1)	Positive (1.1)	Positive (1.1)	Positive (1.1)	Critical (1.2)	Critical (1.2)	Neutral (1.3)
Frequency	Implementation (1.1.1)	Implementation (1.1.1)	Implementation (1.1.1)	Method (1.1.2)	Method (1.1.2)	Practicability and usefulness (1.1.3)	Time limitation (1.2.1)	The teacher's Evaluation (1.2.2)	
	Stimulus for learning (1.1.1.1)	Positive interaction in teamwork (1.1.1.2)	Improvement in knowing (1.1.1.3)	Interest in the topics provided (1.1.2.1)	Various resources (1.1.2.2)				
Group one	5	0	0	1	0	0	1	0	0
Group two	4	1	0	0	2	1	0	0	1
Group three	0	0	5	0	0	0	0	0	0
Group four	1	0	1	0	0	0	0	2	0
Group five	1	0	3	0	0	0	0	0	0
Group six	1	1	3	1	0	0	0	0	0
Group seven	1	0	1	0	0	0	0	0	0
Total	13	2	13	2	2	1	1	2	1

Most responses were positive (frequencies = 33), under which there were two key issues. The frequency of positive responses was concentrated on *stimulus for learning* and *improvement in knowing*. *Stimulus for learning* related to students' belief that the course could stimulate their willingness or curiosity to learn more to enhance their criticality and consequently be helpful for their future.

> *Eileen: After taking this course, I found that my teacher used the Western style to integrate critical thinking into our course, which is different from the spoon-feeding way used in Asia. I gradually became interested in this style. (Stimulus for learning: Unit of coding 1.1)*

Jane: I did not expect different news media might have different views. After taking this course, I started to think about their different positions and perspectives. I hope to learn more about professional knowledge about news like editing and how they think. (Stimulus for learning: Unit of coding 2.4)

Wayne: I thought I would learn how to edit news only but did not expect this course is about viewing news from different perspectives. I have never taken this kind of curriculum before. I think it is helpful. (Stimulus for learning: Unit of coding 5.2)

Eileen pointed out that the notion of critical thinking originating from the West seemed to be not diffusive in Taiwan. Although it has been introduced to be integrated with different disciplines, traditional teaching methods in which teachers are deemed the authority still play a part in Taiwanese education. Jane and Wayne reported how the PBL curriculum was beyond their expectations for the development of critical thinking capabilities.

In response to the PBL stimulus for learning, students reflected on their improvement in abilities, including considering different perspectives, analysis, argumentation, deeper understanding, making judgements, and problem-solving. The first of these was mentioned most frequently.

Wendy: I can use different perspectives to view news articles, from different sides. Reading news makes me know a particular perspective or critical view from a reporter. Reporters may add their views to the news, but some news is not only about describing the reality. (Improvement in considering different perspectives: Unit of coding 3.1)

Willa: My critical thinking improves because we noted both the good and bad parts of both sides. (Improvement in considering different perspectives: Unit of coding 5.8)

Commencing with the recognition, students discovered the difference between critical thinking capabilities and accepting what was informed. They reported their

improvement in the abilities previously mentioned after taking the course because these abilities could be helpful to reach understanding.

> *Gary: I am not so easily persuaded by news any more, and then I try to read more. (Improvement in independent ideas: Unit of coding 3.5)*

> *Yvonne: I am more objective when reading and watching news. (Objectivity: Unit of coding 3.6)*

Critical thinking capabilities were likely to be attained through the PBL collaborative process. The teacher's guidance appeared to be an essential factor.

> *Bonny: We thought our project was complete, but the teacher said it was not enough, so we went back to check the reminder you sent us. The weaknesses the teacher pointed out were that we did not identify the real problem and find out a concrete way to solve the problem, so we especially noticed this part when we did our midterm project. (Improvement in problem-solving: Unit of coding 6.5)*

Another dimension was their peers' influence; two students talked about the benefits of working with group members to develop critical thinking.

> *Lily: We could discuss according to different ideas, which was better than thinking alone. (Positive interaction in teamwork: Unit of coding 2.14)*

> *Patti: Working in a group helps in developing critical thinking because we could exchange views. (Positive interaction in teamwork: Unit of coding 6.7)*

In relation to methods used in PBL, students took advantage of *interesting topics* and *various resources*. These advantages could have practical applications to life.

> *Flora: I think our topic is close to our life, very controversial. We can often read or watch these kinds of issues. We can see the contrast of the differences between Liberty Times and United Daily, their views, issues. Viewers can be influenced by those newspapers. It is obvious that the positions of the two*

newspapers are different, and their views of President Ma and importing American beef were also different. I think it is a good topic we can learn. (Topics: Unit of coding 6.1)

Linda: In this class, we read various news articles from Taiwan and other countries. Compared with our Taiwanese media, sometimes I think the news from international media is more objective though they may also say something positive for their own countries. I think reading news from international media can make me think but watching news from Taiwanese media makes me feel limited to an area, unable to jump out. That is the advantage of watching or reading news from international media. (Resources: Unit of coding 2.9)

Teresa: The cool thing about this course was that we could see things from different angles and understand that different people have various thoughts, views and perspectives. It is quite useful to our life. (Practicability: Unit of coding 2.5)

In contrast to the positive comments, students also talked about the weaknesses of the course in terms of *time limitation* and *the teacher's evaluation*.

Joseph: Some information in the news course was complicated. It made me confused. And time was not enough for me to read all of the information. (Time limitation: Unit of coding 1.6)

Hannah: I am not sure if my critical thinking improves. Even though I got the feedback from the teacher, I still wonder if I am really better than before. (Evaluation: Unit of coding 4.7)

In the first cycle, more of the responses reflected positive comments, about the experience of PBL as a means of developing critical thinking. However, the problems of the course were also recognised. At the preliminary stage of trial and error, students groped after the most appropriate way to proceed with their projects by referring to various sources of information.

6.3.2 Theme One: *Impression* from the Final Focus Group Interview Data

Students' responses to the impression of PBL in the final focus group interview were grouped as shown in Table 6.4.

Table 6. 4 Final focus group interview coding frequency matrix of theme one

T 1									
	Impression (1)	Impression (1)	Impression (1)	Impression (1)	Impression (1)	Impression (1)	Impression (1)	Impression (1)	Impression (1)
Frequency									
	Positive (1.1)	Positive (1.1)	Positive (1.1)	Positive (1.1)	Positive (1.1)	Positive (1.1)	Critical (1.2)	Critical (1.2)	Neutral (1.3)
	Implementation (1.1.1)	Implementation (1.1.1)	Implementation (1.1.1)	Method (1.1.2)	Method (1.1.2)	Practicability and usefulness (1.1.3)	Time limitation (1.2.1)	The teacher's Evaluation (1.2.2)	
	Stimulus for learning (1.1.1.1)	Positive interaction in teamwork (1.1.1.2)	Improvement in knowing (1.1.1.3)	Interest in the topics provided (1.1.2.1)	Various activities (1.1.2.2)				
Group one	1	1	1	2	0	0	0	1	1
Group two	1	1	4	2	0	0	0	0	0
Group three	0	1	6	1	2	0	0	0	0
Group four	0	1	4	1	0	2	0	0	0
Group five	0	1	3	2	0	1	1	0	0
Group six	0	1	1	1	0	2	0	0	1
Group seven	0	1	3	0	0	3	1	0	0
Total	2	7	22	9	2	8	2	1	2

The number of positive responses to students' impression of PBL were higher at the end of the second cycle than were articulated during the midterm interview (frequencies = 50). Students recognised their improvement in different aspects of critical thinking capabilities from which a wider range of answers were identified (frequencies = 22).

Winnie: Before we learned in this class, we did not know how to analyse news, such as using critical thinking to analyse newspapers in different points. After finishing this course, my critical thinking ability improved. I think it is easier to understand the surface of the article, but it is hard to understand the influence of the media on the public. (Improvement in analysis: Unit of coding 3.2)

Lisa: Before the midterm, we just criticised the news from our point of view, but after getting the bad results of our writing, we would write from different sides. We just wrote what we thought in our individual writing without thinking about the media before. (Improvement in considering different perspectives: Unit of coding 4.9)

Carol: Before the midterm, we did not know what to do in PBL, how to take the first step. But after doing the research, we were clearer to know which step we should take first and which was the most important to solve a problem. (Improvement in problem-solving: Unit of coding 7.6)

From their final focus group interview responses, students perceived their development of critical thinking in connection with PBL. In comparison with those in the midterm frequency matrix, there were more articulations about interaction in teamwork, while fewer responses were concerned with how the curriculum stimulated them to learn.

Sam: Working in a group helped to develop our critical thinking because we could exchange our different ideas. Every week, Monday after class, our group members would talk about our next topic that we needed to report in the class. Every person started to express their opinions, and in that discussion, we fought because my personal opinion could not be accepted by other group mates. It was not absolute, so we continued to discuss if our opinion could be covered in the topic next time. So we discussed and spent much time on the Internet or after the class. (Positive interaction in teamwork: Unit of coding 2.8)

Maureen: Teamwork is helpful because everyone has different thinking. We have to take different opinions into consideration. If your opinions are different from others, you have to think about what others think, use other ways to think. (Positive interaction in teamwork: Unit of coding 4.6)

Eileen: I think the course is still attractive to me because I can use critical thinking to analyse the news values. (Stimulus for learning: Unit of coding 1.1)

Sam: Because of this course, I read a lot of foreign news. I like foreign news very much. I am a Taiwanese, so reading Chinese characters is not difficult for me, but reading or watching foreign news to analyse is difficult. It was very challenging, and I was very excited. (Stimulus for learning: Unit of coding 2.13)

Another subtheme— *method* includes two subsidiary issues— *interest in the topics* and *various activities* distinct from those derived from the midterm focus group interview data. Students expressed their interest in studying particular topics and participating in class activities. They highlighted the topics close to their real life and a variety of activities in the classroom.

Teresa: My favourite topic is cultural imperialism. Cultural imperialism is a real problem, a global problem that we did not notice before. Like McDonald's, Starbucks, why have they been so successful since the past? We can learn this by searching imperialism. (Topics: Unit of coding 2.5)

Yvonne: We are interested in the theme, views of the world, and we chose globalisation as our topic. It affects our life a lot. (Topics: Unit of coding 3.5)

Flora: Some of the topics were interesting, for example, Lady Gaga. I searched a lot of information about her, and I read a lot of news about her because I like her. We related her case to the topic of cultural imperialism. (Topics: Units of coding 6.2)

Wendy: It was funny to host a talk show because we could express our opinions, not just report in presentations. (Activities: Unit of coding 3.3)

Winnie: We had many chances of making different presentations, and I think it is useful for our jobs in the future. (Activities: Unit of coding 3.14)

Students tended to put more emphasis on the relationship between topics and their life experiences in the final focus group. This trend also reflected more responses to the *practicability and usefulness* of critical thinking through PBL.

Maureen: I did not think critical thinking would be applied to our life, but after doing our projects about Apple Company, I realised that the issue happens to our life and relates to our daily life. (Practicability: Unit of coding 4.4)

The two concerns— *time limitation* and *evaluation*, however, still remained in the final focus group interview. As PBL was a new learning strategy for students, some reflected that one semester was not enough to absorb and reach deeper understanding, while a student talked about uncertainty after receiving the teacher's evaluation feedback. This suggested the troublesome nature of attaining critical thinking.

Willa: We just stayed on the surface level, hard to go to the deeper level, maybe lack of knowledge and background. And we did not have time to absorb the knowledge. (Time limitation: Unit of coding 5.3)

Joseph: They did not fail to meet my expectations though I thought it was simple. In the beginning, I thought we just focused on some operational principles of media, but actually, it was deeper. It is necessary, but it is not easy to understand critical thinking. (Neutral comment: Unit of coding 1.9)

Even so, students seemed more aware of their improvement in critical thinking through PBL and gave more positive feedback. The subtle change might result from the adjusted teaching strategy and the increasing familiarity with the learning approach in the second cycle. Students' perceptions of PBL in regard to this shift

reflected how they characterised this pedagogical approach.

6.3.3 Theme Two: *Key features* from the Midterm Focus Group Interview Data

Students tended to characterise PBL as problem-raising, analysis, and discussion, reflecting how they approached their tasks in the process (Table 6.5).

Table 6. 5 Midterm focus group interview coding frequency matrix of theme two

T 2	Key features (2)	Key features (2)	Key features (2)	Key features (2)
Frequency	Problem-raising (2.1)	Problem-solving (2.2)	Analysis (2.3)	Discussion (2.4)
Group one	1	0	0	1
Group two	0	1	0	0
Group three	0	0	1	0
Group four	0	0	1	0
Group five	2	0	0	0
Group six	0	0	0	0
Group seven	0	0	0	1
Total	3	1	2	2

Starting from a problem for collaborative analysis and discussion was fundamental to PBL, yet another student placed more importance on solving problems.

> *Jill: I applied PBL by thinking about the problem first. (Problem-raising: Unit of coding 5.6)*

> *Wayne: According to the journalistic questions of the news articles, we would think about deeper questions. We sometimes referred to other perspectives from particular articles, and sometimes the articles inspired us to think about some questions raised. Some were helpful for generating PBL problems. (Problem-raising: Unit of coding 5.7)*

Kenny: We tried to find out an issue worth discussing from two media and then discussed the issue and thought if it was possible to improve. Sometimes the content of different news media made no clear difference. We had to think what exactly they wanted to say. (Discussion: Unit of coding 7.3)

Teresa: I think the ultimate objective of this PBL course was not to criticise others but to find out the best way to solve problems. (Problem-solving: Unit of coding 2.6)

Students' responses were related to the PBL tenets on the basis of which students worked collaboratively for the negotiation and construction of new meanings. In the first cycle, according to the teacher's observations, however, students tended to be stuck at identifying problems for developing critical thinking. Describing controversial issues in news stories, students focused on the problems of selected cases rather than those they aimed to tackle. This might be connected with their hesitation about how to proceed with their projects because of complication and uncertainty, as Joseph and Hannah said (Units of coding 1.6 & 4.7) in Section 6.3.1.

6.3.4 Theme Two: *Key features* from the Final Focus Group Interview Data

The frequency of articulation of key features was reduced to two themes—*problem-solving* and *discussion* in the final focus group interview (Table 6.6). Most responses were concentrated on problem-solving; nonetheless, students tended to point out this characteristic without further illustrating how critical thinking could be developed.

Maureen: We found out the answer through the questions by studying the questions. If you have a question about one thing, you would like to find out the answer. So we could understand the issue through our questions. (Problem-solving: Unit of coding 4.7)

Carol: It is about the problem and where the solution is to solve the problem. (Problem-solving: Unit of coding 7.8)

Table 6. 6 Final focus group interview coding frequency matrix of theme two

T 2	Key features (2)	Key features (2)
Frequency	Problem-solving (2.1)	Discussion (2.2)
Group one	0	0
Group two	0	0
Group three	1	1
Group four	1	0
Group five	1	0
Group six	1	0
Group seven	1	0
Total	5	1

In the first cycle, students tended to be at the stage of learning what PBL was and how to tackle their study. The frequency concentration on problem-solving in the second cycle, by contrast, might result from the acknowledgement of its importance in the last phase of the PBL process. This could be bound up with their realisation of deeper investigation after becoming more familiar with PBL principles. Through the problem-solving approach, critical thinking capabilities were likely to be enhanced or gradually developed to achieve understanding.

6.3.5 Theme Three: *Difficulties* from the Midterm Focus Group Interview Data

Given the use of an innovative strategy for the attainment of critical thinking in media literacy, students were expected to encounter troublesome learning experiences. Two subcategories— *complication* and *uncertainty* were identified under *difficulties,* as shown in Table 6.7.

Table 6. 7 Midterm focus group interview coding frequency matrix of theme three

T 3 Frequency	Difficulties (3) Complication (3.1)	Difficulties (3) Uncertainty (3.2) Definition (3.2.1)	Difficulties (3) Uncertainty (3.2) Direction (3.2.2)
Group one	0	2	1
Group two	2	0	3
Group three	0	0	0
Group four	0	0	2
Group five	0	0	4
Group six	0	0	1
Group seven	0	0	0
Total	2	2	11

Students tended to be unsure about how they tackled their study following PBL procedures in the first cycle. They reflected their uncertainty of the direction, including confusion about what topic they should choose, how to start, or whether they used the method appropriately.

> *Linda: The teacher wanted to give us something, but for us beginners, we had to receive the complicated materials and then thought about how. The process was difficult. (Complication: Unit of coding 2.13)*

> *Peggy: We are still confused about where we should go, what the focus should be. For example, when we did our report, we just presented superficial things. We did not know where we should start to search information. (Uncertainty of direction: Unit of coding 1.12)*

> *Lily: I think my critical thinking was demonstrated because of the teaching, but it seemed that there were more questions coming up. I always doubted 'Is what I said right?' or 'Should I say in this or that way?' 'What does this exactly mean?' (Uncertainty of direction: Unit of coding 2.15)*

Wayne: I think the information provided by the teacher was enough, but we did not know how to find out the controversy. (Uncertainty of direction: Unit of coding 5.4)

Patti: It was hard to choose topics. After deciding a topic, we searched for more information but found it was too difficult to analyse because there were too many professional terms. So we kept on changing topics. (Uncertainty of direction: Unit of coding 6.4)

Undertaking their PBL research was not easy; students were confronted with emerging questions as the process went on. Expressing overlapping ideas, Lily recognised her improvement in critical thinking but also found more emergent learning problems. Lack of the ability to approach concepts in related areas was unlikely to lead to the integration of various ideas and caused stuckness in learning. Students thus regarded the teacher's guidance as assistance. Wayne might articulate in a conservative way and take the blame for the learning problem; Linda, by contrast, thought of too much information as complication. She admitted that it could be the beginner's problem, which also brought about a dilemma for the teacher who needed to consider the subtlety of teaching and learning, such as what and how and how much guidance should be provided for students.

6.3.6 Theme Three: *Difficulties* from the Final Focus Group Interview Data

From the final focus group interview data, students reported uncertainty of undertaking their study, the predicament of dealing with unfamiliar topics and terms, and the difficulty in reaching consensus in teamwork (Table 6.8). It is noteworthy that the idea of disagreement in teamwork was not explicitly discussed by students in the midterm focus group interview.

Table 6. 8 Final focus group interview coding frequency matrix of theme three

T 3	Difficulties (3)	Difficulties (3)	Difficulties (3)
Frequency	Unfamiliarity (3.1)	Disagreement in teamwork (3.2)	Uncertainty (3.3)
Group one	0	1	2
Group two	1	5	0
Group three	1	1	0
Group four	0	0	1
Group five	1	0	2
Group six	0	1	0
Group seven	0	0	1
Total	3	8	6

Referring to the collaborative work, students were still uncertain about how to proceed and required the trigger for crossing the barrier, and those in group two reflected on the problem in working with team members for agreement in particular, probably because their group size was the biggest.

Sam: The teacher introduced politics. I think politics for me was difficult because those news vocabularies were too difficult. It is ambiguous when one vocabulary has two meanings for you to choose. (Unfamiliarity: Unit of coding 2.2)

Wayne: It was hard to understand the meaning of the movie— Good Night, Good Luck. It was very hard to write the reflection because it is about politics that we never learned before. (Unfamiliarity: Unit of coding 5.1)

Maureen: The teacher could tell us how to start by giving us daily examples. Without the teacher's help, we might not think it is easy. (Uncertainty: Unit of coding 4.8)

Jill: We chose a topic to do one of the presentations because we thought there were more news reports about that event. But we did it in the wrong way because we just introduced and described. (Uncertainty: Unit of coding 5.4)

Teresa: We met some problems. We accomplished identifying the problems for study and collected news sources. Of course we had many sources online, but we needed to choose the related or relevant sources by working separately to make it become a complete report. The process was hard because our members had so many various or different suggestions or opinions. Everyone had their working style,… but each should be contacted by all other members… any ways to let others know where they were. But the most difficult part was ah…communication. One day one called another member, but she was doing her work, but the deadline was close. (Disagreement: Units of coding 2.1 & 2.4)

Sam: We would dig into the question, not only the surface of the question. So when we focused on one question, we would see other questions come up from different views, not the focused question. Maybe the news report has some problems, we wonder if we should rethink or not. (Disagreement: Unit of coding 2.12)

Lacking knowledge of politics, Sam and Wayne found it hard to integrate difficult disciplinary ideas. Although Jill was able to point out their problem in learning at the end of the course, passing the threshold of learning hindrance still appeared to lean on the teacher's guidance. Negotiating various opinions in groups as students' sophistication in thinking increased caused more difficulties in accomplishing their projects in a short period. Reaching unanimity for the presentation of students' collective ideas was not the goal of critical thinking through PBL; rather, the clash and exchange of opinions in collaborative work could lead to the potential for transforming thinking and constructing new meanings. Students might not be aware of this transformation; however, the difficulty in reaching consensus might imply that students were becoming more independent at the learning crossroads to a higher thinking level through tackling different perspectives.

6.4 Students' Reflection from Weekly Journals

The data analysis did not intend to label each student; rather, the research attempted to describe similarities and differences between students to exemplify the unfolded learning pattern. Given the variations in individual learning experiences embedded in teamwork, individual development, nonetheless, might be affected by group performance but not necessarily follow group learning pattern. Provided that students might be reluctant to reveal their opinions in public, this section draws on data from three students' weekly journals to look at their learning experiences. Their cases were chosen because they explicitly kept journals of their development in this class.

6.4.1 The Case of Leo

In the first cycle, students tended to absorb knowledge from the teacher rather than generate meanings from their perspective. Leo in group one, a senior undergraduate majoring in English, was silent in class and apt to listen to what the teacher said. He was one of the two students whose midterm and final marks were at the transitional-preliminal stage, higher than others at the absolute-subliminal stage. He recorded his transformation:

> *Week 2: Today I learned about news editing and skills of reading news. I feel great to choose this course.*
>
> *Week 4: This week the teacher introduced comparison of news articles and backgrounds and helped us to detect bias. Although I felt a little confused about the bias, I could discover the differences between different news media.*
>
> *Week 12: After discussing the movie— Good night, and Good luck with the teacher and classmates, I realised that people should report news fairly and justify ideas through evaluation.*
>
> *Week 14: Today our group performed a talk show about stereotype. No matter who you are, black or white, male or female, we are all equal although*

stereotype is still everywhere in today's society. We shared our opinions with our classmates; it was interesting.

From accepting what was learned, having awareness, to trying to justify and present ideas, Leo progressed gradually in his knowing although he was not keen on talking about his thought in the focus group interviews.

6.4.2 The Case of Wayne

Wayne in group five, a junior undergraduate, by contrast, was willing to report his expectations of this course, what he learned, and what difficulties he encountered in the focus group interviews. He tended to enjoy socialising with his peers and the teacher. He wrote his critical learning experiences in his journal:

Week 2: Originally, I thought this class was teaching us how to edit newspapers. However, this class is to teach us how to be critical. It will help me to view things in different ways.

Week 7: Today was not our day. We chose an easy topic— the Goddess of the Sea, Matsu which was also hard. It was difficult to choose a controversial topic. We were worried about what news we could study for the midterm and final assessments.

Week 8: The midterm is coming. We are going to enter the last year of university. It is terrible, but we do not have any reasons and time to say that we are not ready. Thinking about my future, I get bored and impatient now. Do you have any good idea, teacher?

His academic marks regressed from 76 (transitional-preliminal stage), the highest in his group in the midterm to 65 (absolute-subliminal stage), the lowest among his group members' scores in the final, for he involved emotive words such as 'hate' and 'ridiculous' without justification in the final individual writing. In his journal, he expressed his anxiety about the future and turned to the teacher for help because of stuckness in learning.

6.4.3 The Case of Patti

Working with peers in group six whose academic performance was the highest among the seven groups, Patti, another junior undergraduate majoring in English, scored 81 (independent-liminal stage) in the midterm and 78 (transitional-preliminal stage) in the final. She appeared to be a disciplined and motivated student keeping on developing ideas:

> *Week 2: Today just a few students attended the class. Though it was a bit embarrassing, I felt comfortable about this! It was helpful for me to concentrate because the teacher taught in English and this class was difficult. The reason might be that I did not preview, so I decided to study the resources before class.*
>
> *Week 6: We did the presentation and found ours was different from other groups'. We did not focus on the problem, just organised information and answered core questions about US-Korea Free Trade Agreement. After the teacher's reminder, we discussed our report and each of us pointed out something to modify. I hope the next presentation will be better than this one.*
>
> *Week 16: We are living in the century of globalisation. We cannot assert it is good or bad. I believe globalisation is a great force for cultural exchange; however, we should decide how many resources we can absorb in case of assimilation. Nowadays, the same life style is not its definition. After discussing with the teacher, I understood more about how our final report will be presented. Because we did the research, we could not just focus on the news we prefer. I hope this time we can better the report and completely suit the requirements.*

She reflected on her learning by following the teacher's guidance for progression though the collaboration with the teacher was involved. As a motivated student inspired by the critical thinking capabilities rubric established by the teacher, she was sensitive to the way of obtaining higher scores. Through the interaction with her group members whose formal assessment scores were at the transitional-

preliminal and independent-liminal stages, she demonstrated the potential for developing critical ideas to be applied in different topics.

These students expressed feelings explicitly in the second week, after presentations, or during weeks to formal assessments. The three cases did not represent any typical students but showed the variances in learning. Leo was not outspoken in his group but conscious of his transformation, whereas Wayne was conversational and came straight out with his opinions in both focus group interviews and his journal. Patti studied the critical thinking capabilities rubric and worked with the teacher and group peers to meet the objectives. Their learning journey might not be easily detached from their group work, from which group one was inclined to stick to the same topic for modification, group five changed a different topic each time, whereas group six was keen on studying related issues under the same topic (Table 4.4 of Chapter 4). Leo in group one tended to slightly progress in thinking; Wayne in group five was continuously faced with new challenges; Patti in group six, by contrast, gradually incorporated different perspectives in the fulfilment of her critical thinking capabilities, involving abandoning assumptions and making meanings. Different students were therefore confronted with learning problems at different levels and transformed in different ways. In addition to working with peers for improvement, students reflected on their own weaknesses in the journals and leaned on the teacher's facilitation to pass the transitional crossroads.

6.5 Discussion

Students' perceptions of learning experiences suggested the dilemma of using PBL as an effective approach to developing critical thinking capabilities or to causing learning difficulties. According to the findings from various data, students tended to affirm the contribution of PBL to developing critical thinking, including the capabilities to consider various perspectives, analyse the context, and solve problems. The emerging learning problems also arose in the course of the research. For example, from the final focus group interview data, *various activities* and *disagreement in teamwork* emerged after the adjustment of the schedule. In

providing students with different ways of presenting their ideas, some students enjoyed the process of working with team members, while others thought of this as a difficulty in conciliating different views. As their sophistication in thinking developed, peer interaction might enrich rather than sway their ideas. As Patti manifested, choosing appropriate perspectives for justification reached a higher level of understanding.

Students' reflection on their limitations was made explicit in the focus group interviews and their journals. Their responses reflected that the intensive course might lead to students' concentration or distraction, as Leo's and Wayne's cases showed; in other words, the accumulation of information resulted in either meaning-construction or confusion, pertaining to students' variations. Reporting the benefits of using PBL, Wayne and Patti also mentioned their respective difficulties in learning. Different students faced different levels of transitional crossroads to pass though they worked in the same group. Group work could influence their development, yet 'time' meaning the duration of accomplishing their projects and 'space' referring to working collaboratively and individually might produce reciprocal effect. Students manifested their transformation in epistemological and practical dimensions, yet their ontological development might not be visible in the short term. The findings suggested the complexity of teaching and learning because the breakthrough in learning students made appeared to be connected with the teacher's facilitation in the PBL process, and their learning transformation will be explored from their academic performance, perceptions, and the teacher's observation.

Chapter 7 Results 2: How Students' Critical Thinking Shifted

7.1 Introduction

Having investigated students' learning experiences of critical thinking, this chapter presents the findings in relation to students' development of critical thinking in media literacy in the PBL classroom. It addresses the second key research question and more specifically it focuses on two aspects of this question: 1) What, if any transformation occurred in the students' academic performance and 2) How did their understanding of critical thinking and development of critical thinking capabilities in media literacy develop? In addressing these questions, the students' academic group and individual work evaluated by the teacher using the critical thinking capabilities rubric was analysed in association with class observations to validate the findings and explore the pattern of students' learning results of academic performance, while their perceptions of critical thinking development were drawn from answers to the closed and open-ended questions in pre-class and post-class questionnaires. This study used Cohen et al.'s (2007) work for the principles of quantitative data analysis. Descriptive statistics, t-test, and correlations with SPSS were employed to analyse students' scores defined as ratio data. The percentage comparison was used to analyse the ordinal data from answers to closed questions in questionnaires. Qualitative analysis based on themes was used to analyse responses to open-ended questions in questionnaires and less structured observations, together with quantitized frequencies of structured observations with reference to learning patterns. Particular cases were drawn on to further illustrate the findings.

The outcomes of students' academic performance suggested the oscillatory learning pattern, with the most manifest capability of considering different perspectives. Their academic performance, however, was subject to variations despite that the most students were at the transitional-preliminal stage at the end of the course, as shown in Appendix J. The finding also revealed the tension between group dynamics and individual performance, for students were required to work together to develop their critical thinking in the PBL process.

7.2 Students' Academic Group Work

This section deals with students' academic group work throughout the research process. The development of the seven group scores in response to the twenty items of the critical thinking capabilities rubric (Appendix B.2) was analysed as the basis for other data to illustrate, and the six presentation topics chosen by students were presented in Table 4.4 of Chapter 4. This section includes two subsections: academic performance of group presentations and specific capability development. Descriptive statistics were adopted to analyse all the group marks, while t-test was used to discover whether there was any difference between their midterm and final average scores. The teacher' evaluations from observations read by students after marking each of their presentations were supplemented to provide the information about the advantages and weaknesses of their projects.

7.2.1 Descriptive Statistics of Students' Group Academic Performance

As Table 7.1 presents, the means of presentation one, two, three, and four were not distant from each other, but referring to the third presentation, the range between the minimum and maximum scores was very large. The high standard deviation in the third presentation also indicates that the scores were more widely dispersed around the mean. By looking at the skewness for observing the distributions, presentation two and four have negative skew suggesting that there were few low scores. In presentation one and three, by contrast, the positive skew suggests that the bulk of the scores were in the lower range.

Table 7. 1 Descriptive statistics of students' group presentations

Statistic	Range	Minimum	Maximum	Mean	Std. Deviation
presentation1	16	40	56	47.57	7.091
presentation2	7	40	47	43.86	2.545
presentation3	39	22	61	40.86	13.434
midterm	35	38	73	51.57	12.232
presentation4	11	39	50	44.57	3.952
final	24	50	74	62.57	8.039

	Skewness	
	Statistic	Std. Error
presentation1	.272	.794
presentation2	-.543	.794
presentation3	.011	.794
midterm	.701	.794
presentation4	-.030	.794
final	-.246	.794

The average score of the final presentation was 11 points more than that of the midterm (M 62.57- 51.57 = 11). There was a difference of 35 points between the lowest score 38 and the highest score 73 in the midterm, while in the final, the highest score 74 was 24 more points than the lowest score 50. Compared with the minimum and maximum scores in the midterm, those in the final were higher, and the range between the minimum and maximum scores became smaller. The positive skew in the midterm suggests that the bulk of the scores were in the lower range. In the final, by contrast, the negative skew suggests relatively few low values. The standard deviation shows that the range of dispersal in the midterm was wider than that in the final. Due to the disproportionate effect of the outlier, the highest midterm score of 73 affected the data and raised the mean.

By looking at the detailed marks of presentation one, two, three, and four in Table 7.2, each group's development was hardly steady but fluctuant, and the highest and the lowest scores were both in the third presentation. These marks showed that all of the groups' academic performance remained at the absolute-subliminal knowing level, except group six whose score in the third presentation passed the crossroads to the upper level— transitional-preliminal stage.

Table 7. 2 Students' marks of group presentation one, two, three, and four

Presentation→ Group↓	1	2	3	4
1	43	44	48	47
2	55	46	33	41
3	40	40	48	48
4	41	41	29	44
5	56	47	22	43
6	54	45	61	50
7	44	44	45	39

By focusing on formal assessments, from the original data of midterm and final group marks, there was a tendency that students scored higher for the final than for the midterm. Three groups moved up from the absolute-subliminal knowing stage to the transitional-preliminal one (Table 7.3). Group four progressed the most, with a difference of 20 points between the midterm and final scores. Group six, by contrast, obtained one more point in the final assessment despite that their midterm and final scores remained in the independent-liminal phase.

Table 7. 3 The levels of critical thinking students reached in terms of group midterm and final marks

Scores	Excellent Above 80	Good 70-79	Satisfactory 60-69	Poor Below 60
	Contextual-postliminal knowing	Independent-liminal knowing	Transitional-preliminal knowing	Absolute-subliminal knowledge
Midterm	n = 0	n = 1	n = 0	n = 6
Group score		Group six: 73		Group one:56 Group two: 42 Group three: 56 Group four: 38 Group five: 41 Group seven: 55
Final Group score	n = 0	n = 1 Group six: 74	n = 3 Group one: 68 Group three: 65 Group seven: 66	n = 3 Group two: 50 Group four: 58 Group five: 57

7.2.2 The T-Test for Students' Group Midterm and Final Average Scores

The t-test for paired samples was used to discover whether there was a statistically significant difference between the means of the same student groups' midterm and final assessment scores. The level of significance (α = .05) was set for supporting or not supporting the null hypothesis referring to no difference between the midterm and final scores. After running the t-test SPSS, it was found the probability value was statistically significant (ρ = .003; ρ < .05). The mean score of student groups' midterm (M = 51.57, SD = 12.232) was statistically significantly lower (t = -4.806, df = 6, two-tailed ρ = .003) than that of the final on two variables (M = 62.57, SD = 8.039). It suggests that students' average final score was significantly higher than their midterm one with regard to teamwork (Table 7.4).

Table 7. 4 A t-test for group midterm and final average scores

Paired Samples Statistics				
	Mean	N	Std. Deviation	Std. Error Mean
midterm	51.57	7	12.232	4.623
final	62.57	7	8.039	3.038

	Paired Differences				
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference	
				Lower	Upper
midterm - final	-11.000	6.055	2.289	-16.600	-5.400

	t	df	Sig. (2-tailed)
midterm - final	-4.806	6	.003

7.2.3 Group Capability Development of Critical Thinking in Media Literacy

Following the general results, this section concentrates on the specific items included in the critical thinking capabilities rubric for assessing group presentation to look at students' capability development. Twelve items tied up with critical thinking were condensed to six categories for analysis as below:

- Category one: questioning assumptions— combining the ability to *identify the problem appropriately* and *question ideas and assumptions*
- Category two: seeking alternative points and sources of information— combining the ability to *collect information from various resources* and *recognise and consider multiple perspectives*
- Category three: self-reflection on limitations— combining the ability to *involve self- questioning and possibly self-challenge* and *reflect deeply*
- Category four: detecting bias from various sources— combining the ability to *recognise that the issue exists in a historical or social context that may be influential on the response to the task* and *examine meanings and assumptions or context of an issue for analysis*
- Category five: analysis of context— combining the ability to *reinterpret so that the issue can be more clearly analysed* and *select evidence appropriately and sufficiently*
- Category six: reflection on the wider context— combining the ability to *mention the context, purpose and limitations of current thinking* and *incorporate the recognition that the frame of reference or context within which the issue is viewed, could change and affect the conclusion*

It has to be recognised that the categorisation is not definitely distinct because these ideas are interconnected. For example, the ability to *incorporate the recognition that the frame of reference or context within which the issue is viewed could change and affect the conclusion* also requires considering alternative perspectives. The elements of critical thinking need to interact with each other in order to reach a more sophisticated level. The purpose of this analysis was to highlight students' demonstration of particular capabilities which tended to outweigh others according to the assessment.

On the basis of the scale of the evaluation form, the range of the scores for each item was from zero to five. The average scores of two items under the same categories were calculated first to run SPSS. The mean in respect to the six categories in the six presentations is presented in Table 7.5:

Table 7. 5 The average scores of six categories of critical thinking capabilities

	Category 1	Category 2	Category 3	Category 4	Category 5	Category 6
Presentation one						
Mean	2.429	3.071	1.786	2.429	2.500	1.643
Presentation two						
Mean	2.214	2.929	1.786	2.143	2.357	1.643
Presentation three						
Mean	2.071	2.714	1.643	2.214	2.214	1.643
Midterm presentation						
Mean	2.786	3.214	1.643	2.929	2.786	1.857
Presentation four						
Mean	2.786	2.857	1.571	2.357	2.357	2.000
Final presentation						
Mean	3.786	3.357	2.786	3.429	2.857	2.643

The highest and lowest average scores of capability demonstration in the six presentations are listed as follows:

- In the first presentation, students scored the highest for seeking alternative points and sources of information (M= 3.071) but the lowest for reflection on the wider context (M= 1.643).
- In the second presentation, students scored the highest for seeking alternative points and sources of information (M= 2.929) but the lowest for reflection on the wider context (M = 1.643).
- In the third presentation, students scored the highest for seeking alternative points and sources of information (M = 2.714) but the lowest for self-reflection on limitations and reflection on the wider context (M = 1.643).
- In the midterm presentation, students scored the highest for seeking alternative points and sources of information (M = 3.214) but the lowest for self-reflection (M = 1.643).
- In the fourth presentation, students scored the highest for seeking alternative points and sources of information (M = 2.857) but the lowest for self-reflection

on limitations (M = 1.571).

- In the final presentation, students scored the highest for questioning assumptions (M = 3.786) but the lowest for reflection on the wider context (M = 2.643) and self-reflection on limitations (M = 2.786).

Students' scores tended to be higher in considering multiple points of view while lower in reflecting on the wider context and limitations of thinking although a different picture can be seen in the final, where the mean of questioning assumptions (M = 3.786) was the highest among all the components from the first to the final presentations. Low in reflecting as students' score was in the final (M = 2.643), the mean improved in comparison with others in the same column. Each of these capability scores in the final formal assessment was higher than that in other presentations.

7.2.3.1 Capability Development in Media Literacy

As shown in Table 7.6, students' general marks of demonstrating media literacy showed the oscillatory tendency from the first to the final presentations (M = 2.571→2→2.143→2.714→2.143→3.143). Similar to their academic performance of six categories previously presented, students had higher scores in their midterm and final presentations (M = 2.714 and 3.143 respectively). Students tended to score higher for applying critical thinking to understanding media language, according to the highest average scores in the second, third, and midterm presentations. This might have to do with their language discipline since they were all English language majors. The courses offered in this department placed importance on using and applying words or grammatical rules to understanding meanings or ideas. Although what they learned in other courses might not be relevant to the news media field, it seemed easier for them to deconstruct media language. In the case of other three categories, there was quite a variation, yet in the final, representations and audiences were more explicitly addressed.

Table 7. 6 The average scores of students' demonstration in media literacy

	Media literacy— General marks	Production	Languages	Representations	Audiences
Presentation one					
Mean	2.571	3.00	2.71	2.43	2.57
Presentation two					
Mean	2.000	2.29	2.57	2.29	1.86
Presentation three					
Mean	2.143	2.43	2.86	2.00	2.00
Midterm presentation					
Mean	2.714	2.71	2.86	2.71	2.14
Presentation four					
Mean	2.143	2.14	2.43	2.57	2.00
Final presentation					
Mean	3.143	2.71	2.86	3.43	3.43

7.2.4 The Teacher's Evaluation from Observation on Group Work

The following summarises the teacher's evaluations:

1. In the first presentation, group one presented the hard news of Linsanity[3] by comparing articles from CNA (Central News Agency, Taiwan) and *Taipei Times*. Students pointed out the connection of Lin's popularity with the media and concluded:

> *Jeremy Lin has become a product because of the media. Everything relating to him will be hot sale. Thus, various suppliers want to cooperate with him.*

However, they described the phenomenon out of their assumption. In the second and third presentations, they highlighted the language part of the media and compared the differences of articles from *New York Times* and *China Post*, as well as *Taipei Times* and CNN. Referring to the fourth topic— media bias, they

[3] The American born Taiwanese man Jeremy Lin who played basketball well in NBA caused a craze called Linsanity in 2012-13.

addressed the gaps between men's and women's statuses in the Eastern and Western societies by looking at different cases though they did not explicitly explain how the news media manipulated gender bias.

In discussing the relationship between stereotype and the phenomenon of Linsanity in the midterm presentation, they referred to articles raising the question whether Jeremy Lin's success would end stereotypes and discussed the usage of the negative term 'Chink' to discriminate Asians in this case. They questioned and reinterpreted the issue for analysis but did not explicitly address the context and the pros and cons of their ideas. In the final, they chose McDonald's as the case to study the impact of cultural imperialism. They considered the commercialisation of broadcasting and argued:

> *Because McDonald's is closely identified with the culture and lifestyle in the United States, its international business expansion has been termed part of Americanisation and American cultural imperialism. In East Asia, it has become a symbol for the desire to embrace Western cultural norms and affected local customs.*

They further reflected on its influence on the life in Taiwan, including health, food culture, and service industry. They identified the problem appropriately and collected enough information to support their argument.

2. Group two raised the question of what real beauty is by referring to articles with different viewpoints from CNN and BBC in the first presentation. They compared views of women's appearances and considered the contexts in Western, Eastern, and Middle East countries and concluded:

> *The best way to make women feel confident is natural beauty. Just like Lady Gaga's one famous song 'Born this way', the song encourages women to love themselves with who they are, and there is nothing wrong. That 'I am beautiful in my way, cause God made no mistakes' means women should understand that looking imperfect is fine and women should admire how they look.*

Yet, in the second presentation based on the same topic, they failed to consider the background of the problem to relate to the media context. They had a low score in the third because they collected various resources, but the organisation was vague without a clear focus. When addressing the topic of media bias in the fourth presentation, they recognised the complexity among the business, customers, and promoting techniques but did not consider the impact of media bias.

In the midterm, they examined the safety of using cosmetics and identified the core problem: 'Is it worthwhile for women to spend much money on cosmetics?' by raising some questions like 'Why does applying cosmetics cause irritations, allergies and infections?' and 'Can I believe the labels on cosmetic products?' to help find the solution. They drew on professional remarks from various news articles and then concluded:

> *According to what some experts said, there can be toxicant in cosmetics that will cause irritation and allergy. If women want to use cosmetics, the ingredients including plants and minerals can be considered.*

They did not relate the problem to how the news media dealt with the concept of beauty. In the final, they examined the relationship between Coca Cola and advertisement, highlighted its marketing strategy, and discussed the health concern. They mentioned the context by searching different sources but did not evaluate the effects of globalisation.

3. In the first presentation, group three drew on two articles with different styles from *China Post*, discussing the controversy over importing American beef with ractopamine, a muscle-growth drug used as a feed additive. This issue was complicated because it was related to not only food and health but economy, politics, and diplomacy. The government's and student protesters' views were presented, but the ideology hidden behind the stories was not revealed. After modification in the second presentation, they still did not tackle how the media reporting reflected ideology. In the third, they selected the sources from two Taiwanese daily newspapers with diverse stances to compare their views about

allowing Chinese students to study in Taiwan and relate it to the concept of media production. In the fourth presentation, they stressed the subjectivity of news media and pointed out its relationship to media bias.

In the midterm, they were interested in studying the academic and tourist exchanges between Taiwan and China. They compared the articles from two Taiwanese daily newspapers inclined to support two opposing political parties. They questioned and analysed the structures of the articles to which the concept of language is related; nevertheless, they did not clearly explain the context of Taiwanese governmental policies and evaluate the pros and cons. In the final, they referred to the influence of McDonald's as 'McDonaldisation' which has become the emblem of globalisation. They argued:

> *To some extent, McDonald's represents American lifestyle and culture, and globalisation of McDonald's is seen as American cultural imperialism.*

They analysed the marketing strategies via the media and advertisement to attract more audiences, evaluated their pros and cons, and considered how McDonald's changed people's life in terms of recognising the context and effects.

4. Group four listed different structures of different news articles in a neat table but ignored to provide evidence to support their ideas in the first presentation. In the second, they questioned assumptions but did not consider the context. They scored the lowest in the third because of focusing on describing the writing styles of two disaster news articles about five missing commissioned officers in the helicopter crash when rescuing people without reflecting on the connection with media operation. In the fourth, they provided the context of same sex marriage in the United States though the relationship between the same-sex marriage and media bias was not made explicit.

They discussed the controversial issue of importing American beef with ractopamine in the midterm. Though they collected information from different sources and presented various responses, they did not relate the stances to the backgrounds of the news media for analysis and problem-solving. In the final, they

took the products in Apple Company like iPhone as examples of cultural imperialism and regarded the media as a means to increase their popularity. They pointed out the negative influence of the media and the impact of the technological products on social relationship:

> *Because the media keep reporting the products, people are influenced imperceptibly, and some just want to follow the fashionable trend. Children play the games on the screen while their parents chat with their friends. Their relationships may gradually become weaker.*

They identified the problem, considered multiple perspectives and related the issue to representations and audiences.

5. Group five discussed the controversial issue of building another nuclear power plant in Taiwan and compared the articles from *China Post* and *Taipei Times*. They made a table by listing the problems and different stances of the two media but failed to provide further information to support their argument in the first presentation. In the next, they talked about the river problem and compared the structures of different articles to highlight the differences. Although they discussed the river problem from different angles, they did not explicitly consider how views from news media affected the ways of reporting. They were given the lowest score in the third presentation of the temple fair of Matsu, the Chinese Goddess of the Sea because they merely introduced the event with its historical background rather than involved critical thinking. When working on the reports about gender bias in the fourth presentation, they emphasised discrimination against women by referring to different news media but still neglected to investigate how media bias affected the reporting.

They were concerned about the controversy over Taiwan's independence in the midterm. They introduced the background of the political movement and then compared different views:

> *Many countries, including the USA, Japan, and Russia do not want to see that Taiwan is unified into China, but they will not support Taiwan's*

independence as well.

They pointed out the complexity of this issue but did not explain the reason. Their final topic was also globalisation, for which Korean fashion, particularly drama was the focus. They mentioned the current phenomenon and its impact on Taiwanese television broadcasting and then discussed the problems of showing Korean dramas on television. They considered the needs of different audiences but neglected to evaluate the pros and cons of their proposal— building an exclusive channel to show Korean dramas for their fans.

6. Group six searched a variety of information to consider different views of the influence of the famous brands of Coca Cola and Pepsi. They provided adequate evidence to support their first argument. In the second, however, in an attempt to evaluate the influence of the U.S. - South Korea Free Trade Agreement, they compared the background and organisation of the news articles but left the media context out of consideration, resulting in scoring the lowest among their presentation marks. After amendment, they compared different news items about importing American beef and related to the concepts of media literacy, especially languages and audiences and the wider environment. In the fourth, they discussed the outrage over 'disturbing' curvy LEGOs for girls and proposed incorporating voices from women's groups, but the relevant element 'representations' was not expounded.

Owing to presenting different views from various sources with a clear structure systematically, they scored the highest among the seven groups in the midterm. They compared the headlines about American beef controversy from different newspapers and identified their positions, analysed the language used and related it to audiences. They further raised some questions with regard to bias and objectivity as well as the impact of media. For example, in response to the question: 'Do media representations affect our views of particular social groups or issues?', they answered:

Yes, first of all, we were angry at our President Ma because it seemed like he only cared about our economic competitiveness regardless of people's health. However, after discussing with each other, we realised the reason why he said in this way even though we still felt upset. And we did not think it was appropriate for some news media to use extreme words to criticise because they seemed to oppose for the sake of opposition.

They reflected on the news though the pros and cons of the measures were not evaluated:

The government should consider the policy in many ways rather than just place importance on benefits. For a leader of a country, it is the most important to bear people's interest and economic progress in mind. In addition to the policy of importing American beef, supplementary measures are needed.

In the final, they presented the multi-force influence of the pop music sensation, Lady Gaga on popular culture. Starting from introducing the current phenomenon, they then evaluated the pros and cons of her influence by referring to different news reports from various sources. They listed three points to answer the question they raised about the way of reacting to her influence:

1) Reading news and making judgement; 2) Expressing opinions in public and sharing comments; 3) Participating in meaningful activities.

Their project considered multiple aspects and also included practical suggestions of taking action.

7. Group seven conferred on the issue of the shooting of sixteen Afghan civilians allegedly by an American soldier and compared the hard news reports from CNN and BBC. They analysed from the structures of those articles but did not investigate further due to lack of studying the context. In the following presentation, concerning the topic that Coke and Pepsi changed the manufacturing process because of containing cancer-causing colouring, they deconstructed the structure

to compare the news articles but did not again refer to the context. In the following two presentations with different controversial topics, they still gave the context and views from various groups little consideration.

Focusing on discussing the influence of colouring contained in Coke and Pepsi on health in the midterm, they analysed by answering journalistic questions, including when, where, who, what, how questions used to highlight some parts in the context. Their analysis was organised, but the relationship between the issue and the concepts of media literacy was not made explicit. In the final, they discussed the current phenomenon of news reporting in Taiwan and argued that the emphasis on national or local news instead of international news might affect the Taiwanese views of the world. They related the situation to stereotyping because of prior assumptions or limited information. They reported the media influence on how the Taiwanese think of China:

> *Some people think that China is a developing country falling behind, but some of our news media just reported negative or limited information. We cannot receive holistic information but can surf the Internet to broaden our horizons.*

They questioned assumptions of news media and provided a solution of referring to alternative information.

Students kept on modifying their presentations of the same topics in the first cycle despite that they tended to be used to the convenient way of analysing the news articles rather than investigating the context. However, they more or less demonstrated critical thinking by questioning assumptions, referring to different sources of information, considering opposite views, and making judgements. Their midterm and final projects were also revised on the basis of their previous works. The trend of analysing the news articles at the expense of deeper investigation into the context still existed, yet in the final assessment, students tended to reflect on themselves as audiences and who were represented, as well as the connection between the media and real life and endeavoured to provide solutions.

7.2.5 Findings from Group Academic Performance

The fluctuant movement of students' group marks suggested that their development of critical thinking was not straightforward but complex. Their scores from the first to the final presentations went up and down but remained at the two lower stages, except for group six whose midterm and final marks were at the independent-liminal stage. Higher marks tended to be concentrated on the final formal assessment, and the mean of the final marks was statistically significantly higher than that of the midterm ones. By looking at specific components of critical thinking capabilities, their demonstration of referring to different sources tended to outweigh that of reflecting on self-limitations and the wider context. In applying critical thinking to media literacy, students tended to pay more attention to analysing language, responding to their subject background. The teacher's evaluations from observations illustrated the statistical findings. The trend of group development, however, might involve individual variations complicating the transformation.

7.3 Students' Academic Individual Work

This section considers the data in relation to students' independent writing to look at the development of critical thinking at an individual level based on the critical thinking capabilities rubric (Appendix B.1). Two subsections are included: academic performance of individual writing and selected cases for illustration. Descriptive statistical analysis was used to analyse all the individual marks, while t-test was used to determine whether there was any statistically significant difference between the individual midterm and final marks in particular.

7.3.1 Descriptive Statistics of Students' Individual Academic Performance

Students' writing including three assignments with presentation one, two, and three in the first research cycle and three assignments with presentation four, a talk show and a group discussion in the second cycle was ranked from D (scores 60-69), C (scores 70-79), B (scores 80-89) to A (scores 90-100). Table 7.7 shows that the score rank obtained by the greatest number of students was C in five times. The

lowest score rank was D in all the six times, while the highest one was B from the second to the sixth times.

Table 7. 7 Descriptive statistics of six individual writing

		Writing one	Writing two	Writing three	Writing four	Writing five	Writing six
N	Valid	35	35	35	35	35	35
	Missing	0	0	0	0	0	0
Mode		C	D	C	C	C	C
Minimum		D	D	D	D	D	D
Maximum		C	B	B	B	B	B

The frequency and percentage table (Table 7.8) also shows that the greatest number of scores were concentrated on rank C (18, 19, 22, 22, 25 out of 35 students in writing one, three, four, five, and six). In the first writing task, no students' scores reached rank B, whereas in the fifth writing task, 7 students scored above 80. By bringing the lowest stage of scores 60-69 into focus, the number of students tended to go down except in the second writing (n = 17→21→14→11→6→6); with respect to the stage of scores 70-79, by contrast, the number of students tended to go up except in the second writing (n = 18→13→19→22→22→25). The number of students scoring between 80 and 89 also tended to go up except in the sixth writing (n = 0→1→2→2→7→4). The development shifted back and forth but generally moved in a forward direction, from which one can see there were high clusters of scores around the rank C showing the clear peak among the four ranks despite another higher cluster of scores around the rank D in the second task.

Table 7. 8 Frequencies and percentages for students' individual writing marks

Writing one		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	D60-69	17	48.6	48.6	48.6
	C70-79	18	51.4	51.4	100.0
	Total	35	100.0	100.0	
Writing two		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	D60-69	21	60.0	60.0	60.0
	C70-79	13	37.1	37.1	97.1
	B80-89	1	2.9	2.9	100.0
	Total	35	100.0	100.0	

Writing three		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	D60-69	14	40.0	40.0	40.0
	C70-79	19	54.3	54.3	94.3
	B80-89	2	5.7	5.7	100.0
	Total	35	100.0	100.0	
Writing four		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	D60-69	11	31.4	31.4	31.4
	C70-79	22	62.9	62.9	94.3
	B80-89	2	5.7	5.7	100.0
	Total	35	100.0	100.0	
Writing five		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	D60-69	6	17.1	17.1	17.1
	C70-79	22	62.9	62.9	80.0
	B80-89	7	20.0	20.0	100.0
	Total	35	100.0	100.0	
Writing six		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	D60-69	6	17.1	17.1	17.1
	C70-79	25	71.4	71.4	88.6
	B80-89	4	11.4	11.4	100.0
	Total	35	100.0	100.0	

Concerning their midterm and final individual writing marks, table 7.9 shows the levels the number of students reached; the trend of concentrating around the transitional-preliminal knowing became clear. By focusing on the two lower levels, the number of students in the transitional-preliminal knowing stage was the same as that in the absolute-subliminal knowing stage in the midterm (n = 15), but in the final, more students moved up to the transitional-preliminal stage (n = 21). At the independent-liminal knowing level, the number of students in the midterm (n = 5) was not distant from that in the final (n = 4).

Table 7. 9 The levels of critical thinking students reached in terms of individual midterm and final marks

	Excellent 90-100	Good 80-89	Satisfactory 70-79	Poor 60-69
Scores				
	Contextual-postliminal knowing	Independent-liminal knowing	Transitional-preliminal knowing	Absolute-subliminal knowledge
Midterm	n = 0	n = 5	n = 15	n = 15
Final	n = 0	n = 4	n = 21	n = 10

By looking at Table 7.10 comparing their midterm and final development, it was found that more students made progress (n = 19) than those who went backward (n = 12), while 4 students remained the same.

Table 7. 10 Students' development in midterm and final individual writing

Development	The number of students
The same score/ the same stage	4
Progression/ the same stage	10
Progression/ different stages	9
Regression /the same stage	8
Regression/ different stages	4

Referring to the descriptive statistics in Table 7.11, there was a difference of 21 points between the lowest score 63 and the highest score 84 in students' midterm individual writing; in the final, the highest score 88 was 26 more points than the lowest score 62. There was no big difference between the minimum and maximum scores of the midterm and those of the final. The positive skew suggests that the bulk of the midterm scores were in the lower range; the distribution in the final, by contrast, suggests that there were relatively few low values. Different from those in group scores, the values of the mean and standard deviation of the individual midterm and final marks were close to each other.

Table 7. 11 Descriptive statistics of individual midterm and final writing marks

	N Statistic	Range Statistic	Minimum Statistic	Maximum Statistic	Mean Statistic	Std. Deviation Statistic
Midterm marks	35	21	63	84	72.29	6.071
Final marks	35	26	62	88	73.26	6.007

	Skewness Statistic	Std. Error
Midterm marks	.360	.398
Final marks	-.037	.398

7.3.2 The T-Test for Students' Individual Midterm and Final Average Scores

The t-test for paired samples was also used to discover any statistically significant difference between the means of the same students' individual midterm and final scores. As what was found, no statistically significant difference was found (t = -1.077, df = 34, two-tailed ρ = .289; ρ > .05) between the mean of individual students' midterm (M = 72.29, SD = 6.071) and that of the final on two variables (M = 73.26, SD = 6.007). It suggests that there was no manifest improvement in students' individual academic performance at the end of the course (Table 7.12).

Table 7. 12 A t-test for individual midterm and final average scores

Paired Samples Statistics				
	Mean	N	Std. Deviation	Std. Error Mean
Midterm	72.29	35	6.071	1.026
Final	73.26	35	6.007	1.015

	Paired Differences				
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	
Midterm – final	-.971	5.338	.902	-2.805	

	Paired Differences 95% Confidence Interval of the Difference Upper	t	df	Sig. (2-tailed)
Midterm – final	.862	-1.077	34	.289

7.3.3 The Teacher's Evaluation from Observation on Individual Work

Only two students' writing tasks remained at the absolute-subliminal level from the beginning to the end. Peggy in group one involved a lot of negative criticisms. For example, she wrote about Linsanity:

> *The media control our ideas. We not only ignore our opinions but also follow the direction of what the media tell us. The media are just like the cruel devil. When you have great achievements, the media will crazily talk*

about you. On the contrary, if you do not do well, the media will overlook you.

Though she might point out some problems in the media world, her use of the emotive words diverge from critical thinking which requires reasoning. In the following writing, she was concerned about the influence of the news report but did not take account of other factors like audiences and profit-making nature of business:

Why was Jeremy Lin so lucky to win the VOLVO contract? My answer is the media. Because the media crazily propagandized Linsanity, he became the talking point. So many companies wanted to cooperate with him.

She tended to 'criticise' media by describing what was seen rather than 'think critically' about the 'how' and 'why' questions. Maureen in group four described what happened in the accident of the helicopter falling into the sea and showed mercy to the five missing rescue officers:

I think that the rescue teammates were so poor because they did the mission for the people, but they sacrificed themselves. We have to show respect because they did all for us. We should hope they can be found soon.

She felt strong compassion but did not critically consider voices from the Defence department, other perspectives, and problem-solving aspect. How this event related to the concepts of media literacy was not explicitly addressed. These two students both expressed their uncertainty of learning in focus group interviews, as shown in Sections 6.3.5 and 6.3.6 of Chapter 6.

Jenny in group seven, by comparison, was the only student who scored B in both the second and third writing. Though she obtained C and D in the fourth and fifth writing respectively, her score went up back to B in the sixth. In her second writing, she referred to different views of the controversy over cancer-causing ingredients in Coke and Pepsi and reflected on real life. She concluded:

Because Coke and Pepsi are popular drinks around the world; the companies wanted to ensure their products would not be subject to the requirement of a scientifically unfounded warning, but they unfortunately ignored the influence of the interaction of the media and business on human beings' health.

She considered the image of the brands and the power of the media and contemplated the impact on audiences. In the third writing, she drew on various sources to discuss the controversial issue of North Korean nuclear programme. She compared views from the United States, North Korea, and China to reveal the complexity of diplomacy and stressed the importance of international norms surrounding non-proliferation and preventing destabilising nuclear weapons. She then regressed in the fourth and fifth writing because she described the event of a Chinese human right activist who planned to study in the United States and expressed her unsubstantiated opinion without evidence. In the sixth writing, she pondered the impact of Hollywood movies on audiences in relation to cultural imperialism:

American movie heroes often show their bravery, endurance, selflessness, sacrifice and humility when they face challenges. People are attracted by the model of popular personality traits, and it is borderless. Cultural imperialism is understood as the imposition of one national culture upon another and the media are seen as central to this process as carriers of cultural meanings. It is the reason that American movies have the advantage of popularity.

The midterm for Teresa in group two was like a dividing line before which she scored C but B after that. In the first two writing about beauty and cosmetic surgery, she made some statements without explanation or evidence:

Having a nice looking would please people. If a surgery is successful, we can appreciate their beauty. Pursuing superficial beauty nowadays has become a trend.

Though in her third writing, she provided some evidence to conclude that consumers should be careful when using cosmetics because most of the components contain chemicals, it appeared to be distracted from medial literacy. After the midterm, however, she amended the writing direction from the experiences learned before and took account of the context. She further connected the life experiences with the concepts of media literacy to make adequate judgements.

The difference between students' midterm and final individual writing was not statistically significant, yet some students' individual academic performance tended to manifestly shift. Among 35 students, 9 students made progress from one stage to another, while 4 students regressed from a higher to another lower stage. Two particular cases where students' scores went up and down the most were chosen for discussion. As previously mentioned, Teresa's scores apparently improved after the midterm. Her scores were advanced from 69 in the midterm to 81 in the final. In her midterm writing entitled 'Show your beauty', she started by talking about the life experiences of using cosmetics and then commented on what her group found out about the chemical components. Focusing on the surprising facts, she did not relate the topic to news media for deeper analysis and reflection. In the final, by contrast, she analysed the relationship between the noted brand—Coca Cola and media by listing the following propagandistic strategies:

> *1) Flyers: They were issued when networks were not prevailing in early days; 2) Radio, Television broadcasting, and Internet; 3) Advertising vehicles: Pushcarts are used to peddle in some African countries; 4) Philanthropy: Enterprises contribute money to charity for ameliorating the poor's life; 5) Celebrity spokesman: Celebrities would quickly enhance the popularity of its products.*

She pointed out that enterprises and media are of mutual benefit, referring to another form of propaganda and evaluated the positive and negative consequences for the society. Her analysis pertained to the impact of globalisation which requires consideration of the contextual or cultural differences.

On the contrary, Wayne in group five scored 76 in the midterm, the highest among the scores in his group but 65 in the final, the lowest instead. He wrote in his midterm paper:

> *The independence of Taiwan has been a big controversy for many years. Actually, I used to ignore this problem and thought it was none of my business, but after discussing this topic with my team members and asking their opinions, I realised how big this issue is and why it caused a fierce debate.*

He considered the political background of the debate, evaluated the different views of independence and scrutinised possible economic and social effects despite that he still used the negative emotive word 'hate' to describe his feeling about Chinese people. His impression of the Chinese might be affected by the media; probing the impact of news media from different backgrounds on this controversy for reflection was of concern. In his final writing, however, he tended to use stronger emotive words to describe those who criticised Korean pop culture. Though he said, 'I am neutral', his remarks were inclined to be temperamental:

> *I hate people to ask me why. 'Why do you like Korea culture? They are bad and they are all dogs.' These people just react as if I did something extremely wrong. That is really ridiculous for me.*

In this case, he did not explicitly address the topic of globalisation in relation to Korean culture and evaluate the pros and cons but argued that it was nonsensical for others to judge what he liked.

In comparison with the group work, individual students' learning curves could be more complicated because every student was unique, using various ways of approaching current events. In the process of developing critical thinking, students considered what they saw, heard, and felt to express their opinions. It might be reduced to superficial articulations if no deeper contextual analysis and reflection were involved. From Teresa's and Wayne's cases, students' development was inseparable from their life experiences and feelings, as well as different reasons,

such as familiarity with or interest in the topic. In response to critical thinking capabilities, students at the transitional-preliminal stage involved different perspectives for analysis but neglected to look at events in context and challenge their own thinking, yet the integration of ideas was manifested by those at the independent-liminal stage.

7.3.4 Findings from Individual Academic Performance

In individual writing, students could express their opinions which did not necessarily conform to what their group members thought; it was thus more likely to read their thinking about an issue. Without collaboration with the team, however, their thinking could be biased or limited. Students' individual academic performance seemed to suggest that their intellectual development of critical thinking was bound to transform with the affective and social aspects of learning, for how the individual thinking interacted with group learning played an important part in the PBL process, as argued in Chapter 6.

7.4 Correlations between Group and Individual Academic Performance

This section is concerned with discovering whether there was a relationship between group and individual academic performance of formal assessments by looking at whether the probability is sufficiently low to reject the null hypothesis. As Table 7.13 shows, using the Pearson product moment correlation, a statistically significant correlation was found between students' group and individual midterm performance (r = .512, two-tailed ρ = .002). Those students who had higher group midterm scores tended to have higher individual academic performance, and those who were given lower scores tended to have lower individual academic performance. Referring to the final assessment, there was no statistically significant correlation found between the group work and individual performance (r = .234, two-tailed ρ = .176). It might imply that students became more independent in thinking at the end of the PBL course, so teamwork could not affect them so much as the way in the midterm. The theme of *disagreement in teamwork* emerged as one of the learning difficulties in the second research cycle presented

in the previous chapter reflected individual students' different thinking about working with group members after the midterm.

Table 7. 13 A Pearson product moment correlation for students' group and individual academic performance

Correlations		Group midterm marks	Individual midterm marks
Group midterm	Pearson Correlation	1	.512**
	Sig. (2-tailed)		.002
	N	35	35
Individual midterm	Pearson Correlation	.512**	1
	Sig. (2-tailed)	.002	
	N	35	35
		Group final marks	Individual final marks
Group final	Pearson Correlation	1	.234
	Sig. (2-tailed)		.176
	N	35	35
Individual final	Pearson Correlation	.234	1
	Sig. (2-tailed)	.176	
	N	35	35

**. Correlation is significant at the 0.01 level (2-tailed).

7.5 Analyses of Questionnaires Related to Students' Development of Critical Thinking and Media Literacy

In investigating students' responses to their development of critical thinking in the media literacy class, they completed questionnaires at the beginning and the end of the course for analysis (Appendix F). All the 35 students returned the pre-class questionnaires, whereas 31 students returned the post-class questionnaires, with a high response rate. This section includes two parts: the analysis of answers to closed questions and that of answers to open-ended questions. The former involves percentage comparison, and the latter bottoms on categorised themes. Students' answers were analysed to see whether their responses corresponded to how they performed academically.

7.5.1 Analysis of Responses to Closed Questions

The design of pre-class and post-class closed questions was based on the Likert scale format from 1— disagree strongly, 2— disagree slightly, 3— no opinion, 4— agree slightly, to 5— agree strongly to retrieve quantifiable information. Among the total 25 questions, questions 11 to 25 are highlighted to explore students'

understanding of critical thinking and media literacy. Questions 11 to 13 pertain to students' fundamental knowledge of media production, and questions 14 to 25 are confined to their perceptions of understanding critical thinking associated with media literacy. Questions with the same numbers in the pre-class and post-class questionnaires correspond to each other. The percentages and frequencies for these closed questions are presented in Appendix K.

7.5.1.1 Percentage Comparison

This section compares the valid percentages of the positive responses (4— agree slightly and 5— agree strongly) to questions 11 to 13 and questions 14 to 25 in pre-class and post-class questionnaires in spite of the small missing values (Table 7.14).

Table 7. 14 Percentage comparison for closed questions 11 to 25 in questionnaires

Choice	Pre-class percent	Post-class percent	Pre-class valid percent	Post-class valid percent
Pre-class question 11: I understand that the news messages are constructed				
Post-class question 11: I understand how to analyse news messages after taking the course				
Agree slightly	45.7	42.9	47.1	48.4
Agree strongly	14.3	28.6	14.7	32.3
Total	60.0	71.5	61.8	80.7
Pre-class question 12: I understand how news is gathered				
Post-class question 12: I understand how to analyse the way news is gathered after taking the course				
Agree slightly	28.6	45.7	28.6	51.6
Agree strongly	5.7	20.0	5.7	22.6
Total	34.3	65.7	34.3	74.2
Pre-class question 13: I understand how news is presented				
Post-class question 13: I understand how to analyse the way news is presented after taking the course				
Agree slightly	37.1	37.1	37.1	41.9
Agree strongly	11.4	22.9	11.4	25.8
Total	48.5	60.0	48.5	67.7
Pre-class question 14: I heard critical thinking before				
Post-class question 14: I understand what critical thinking is after taking the PBL course				
Agree slightly	48.6	34.3	50.0	38.7
Agree strongly	22.9	34.3	23.5	38.7
Total	71.5	68.6	73.5	77.4
Pre-class question 15: I know what critical thinking is				
Post-class question 15: I find it helpful to understand critical thinking via PBL				
Agree slightly	45.7	37.1	47.1	41.9
Agree strongly	11.4	28.6	11.8	32.3
Total	57.1	65.7	58.9	74.2
Pre-class question 16: I know the importance of critical thinking in understanding the media				
Post-class question 16: I understand the importance of critical thinking in media literacy via PBL				

Agree slightly	40.0	28.6	41.2	32.3
Agree strongly	20.0	34.3	20.6	38.7
Total	60.0	62.9	61.8	71.0
Pre-class question 17: I question ideas or assumptions in media messages				
Post-class question 17: I always question ideas or assumptions in media messages				
Agree slightly	51.4	40.0	51.4	45.2
Agree strongly	8.6	17.1	8.6	19.4
Total	60.0	57.1	60.0	64.6
Pre-class question 18: I understand what bias is in media messages				
Post-class question 18: I am able to detect bias in media messages				
Agree slightly	37.1	42.9	38.2	48.4
Agree strongly	14.3	17.1	14.7	19.4
Total	51.4	60.0	52.9	67.8
Pre-class question 19: I analyse media context				
Post-class question 19: I am able to analyse media context				
Agree slightly	25.7	51.4	25.7	58.1
Agree strongly	11.4	8.6	11.4	9.7
Total	37.1	60.0	37.1	67.8
Pre-class question 20: I seek alternative points and sources of information when reading the media				
Post-class question 20: I am able to seek alternative points and sources of information when reading the media				
Agree slightly	40.0	60.0	40.0	67.7
Agree strongly	8.6	11.4	8.6	12.9
Total	48.6	71.4	48.6	80.6
Pre-class question 21: I understand the production of media				
Post-class question 21: This course helps me to understand the production of media				
Agree slightly	31.4	51.4	32.4	60.0
Agree strongly	5.7	25.7	5.9	30.0
Total	37.1	77.1	38.3	90.0
Pre-class question 22: I understand how meaning is conveyed through the media				
Post-class question 22: This course helps me to understand how meaning is conveyed through the media				
Agree slightly	40.0	62.9	41.2	71.0
Agree strongly	8.6	14.3	8.8	16.1
Total	48.6	77.2	50.0	87.1
Pre-class question 23: I understand how media represent particular groups				
Post-class question 23: This course helps me to understand how media represent particular groups				
Agree slightly	40.0	37.1	41.2	41.9
Agree strongly	11.4	37.1	11.8	41.9
Total	51.4	74.2	53.0	83.8
Pre-class question 24: I understand how the media speak to audiences				
Post-class question 24: This course helps me to understand how media speak to audiences				
Agree slightly	65.7	37.1	65.7	41.9
Agree strongly	5.7	40.0	5.7	45.2
Total	71.4	77.1	71.4	87.1
Pre-class question 25: I believe understanding how media production, language, representation, and audience interact is related to critical thinking				
Post-class question 25: The PBL curriculum is effective in developing my critical thinking in media literacy				
Agree slightly	60.0	34.3	61.8	38.7
Agree strongly	8.6	28.6	8.8	32.3
Total	68.6	62.9	70.6	71.0

As shown in this table, for all of these questions, the total valid percentages of positive answers increased after the course, and the positive answers were more than negative ones (Appendix K). Students generally perceived that they improved in analysing news production, yet it is worth noting the difference between answers to questions 14 and 15 about critical thinking. In response to question 14, although students recognised their development of understanding critical thinking after the course, the percentage increase (3.9%) tended to be much lower than that in their knowing about critical thinking via PBL (15.3%). The valid percentages of positive answers to these two questions (77.4% & 74.2%), however, are not distant from each other. It suggested the contribution of PBL to students' progression to attaining critical thinking. The small percentage increase in answers to question 14 might imply either that they had established knowledge before taking the course or that it could be straightforward to agree with 'hearing' instead of 'understanding' critical thinking in the pre-class questionnaire. Students' positive appraisal of the effect of PBL on developing critical thinking in media literacy was also found from responses to question 25, where there were no negative answers in post-class questionnaire. By considering missing values and comparing the percentages of positive responses, nevertheless, the post-class percentages slightly decreased in questions 14, 17 and 25. It might suggest no significant differences between these items before and after the course. Referring to pre-class question 25, recognising the connection between critical thinking and media literacy was likely to be reasonably accepted by students though they were not taught about the concepts before the course.

As their academic performance showed, students tended to consider alternative points and sources of information when reading the media, responding to the percentage increase in answering question 20. Regarding the four concepts of media literacy, as can be seen from questions 21 to 24, students' positive appraisal of this course was also manifest.

7.5.2 Analysis of Responses to Open-Ended Questions

Ten open-ended questions were raised to ask students' perceptions of news media, critical thinking and the curriculum in pre-class and post-class questionnaires respectively. In centring on critical thinking in the media literacy context, responses to questions 6, 7, 8, and 9 in the pre-class questionnaire and questions 6, 7, and 8 in the post-class questionnaire were grouped into categories to invite personal comments in addition to circling choices. Their responses were classified according to the frequencies of characteristics students reported, among which some students noted more than one trait.

7.5.2.1 Perceptions of Critical Thinking

Two pre-class questions revolve around what students thought of critical thinking:

- Question 6: If you think that critical thinking is important, please describe why.
- Question 7: What is your definition of critical thinking?

In response to these two pre-class questions, question 6 in the post-class questionnaire was included to determine students' understanding of critical thinking after taking the PBL curriculum:

- Question 6: Describe your understanding of critical thinking after taking the course.

Students' responses to the two pre-class questions were similar given the overlapping ideas. Their answers were categorised into 10 and 9 groups from the frequencies of students' pre-class and post-class responses to featuring critical thinking (Table 7.15).

Table 7. 15 Students' responses to features of critical thinking from open-ended questions in questionnaires

Categories	Frequencies (pre-class)	Frequencies (post-class)
Independent thinking	14	12
Recognising different views	8	4
Analysis of context	7	4
Making judgement	6	1
Understanding	4	2
Questioning	3	4
Problem-solving	1	4
Evidence	1	0
Political rule	1	0
Idea-criticising	1	0
Objectivity	0	1
Practicability in life	0	1

Critical thinking, according to the frequencies, was mostly characterised as independent thinking. Other elements, including recognising different perspectives, analysis of context, and questioning were identified as critical thinking capabilities specified in Chapter 2. One student commented on the importance of the ability to make independent decisions:

> *I think critical thinking is very important because we should have our own value to determine what is correct or wrong. And critical thinking is having our own opinion to analyse what we read.*

This response involved not only independent thinking but also judgement and analysis, but 'our own value' and 'our own opinion' were stressed, indicating thinking independently surmounted other elements. Another student, however, appeared to equalise critical thinking and criticising:

> *In my opinion, critical thinking is not good or bad. It's so important for everyone, and we can hear criticisms on TV news talk show programmes every day.*

In Taiwan, television news stations broadcast political talk shows in which guests are invited to comment on current governmental policies or their implementation. Though guests may be experts capable of making judgements in different fields, it is likely that with more sensational criticisms, there will be higher audience rating. That might result in linking critical thinking and politics although they are different notions. From the post-class questionnaire, by contrast, objectivity and practicability were added; the students reported:

Critical thinking is to analyse the events from an objective angle.

Critical thinking is helpful to the way we deal with different situations every day.

They implied that analysis needed to involve dissenting outlooks, and critical thinking learned in the classroom could be transferable to real life. By looking at whether PBL helped students to develop critical thinking specifically, 24 out of 31 students positively appraised this method. Their responses to question 7 in the post-class questionnaire were further categorised (Table 7.16). Due to the teamwork nature of PBL, students tended to take advantage of different perspectives. Here are some of their comments:

PBL did help me because the procedure provided a lot of points of view I never thought of. It is a brand new concept for me.

When we worked in a group, we could listen to different points of view, found the problem with each other, and then found out a solution.

After finding a problem, I found a lot of information from different sources and then compared the different standpoints.

I thought about the problem in different ways.

Via PBL, we could develop our thinking by brainstorming to get different ideas.

Table 7. 16 Students' responses to how PBL helped to develop critical thinking from the open-ended question in the post-class questionnaire

Categories	Frequencies
Recognising different perspectives	13
Enhancing problem-solving	8
Questioning	3
Thinking independently	2
Making judgements	2
Analysing	1

7.5.2.2 Applying Critical Thinking in Media Literacy

In examining students' understanding of critical thinking in media literacy, the two pre-class questions are:

- Question 8: Can you connect critical thinking with reading and writing the media? If yes, please explain.

- Question 9: Have you learned to use critical thinking in reading and writing the media? If yes, please describe more details.

Students might be able to point out some features of critical thinking at the beginning of the course, but only 2 students could connect critical thinking and media literacy. The outcome tended to be related to their past learning experiences which could be discovered from responses to question 9 (Table 7.17).

Table 7. 17 Students' responses to understanding of critical thinking in media literacy from open-ended questions in the pre-class questionnaire

Answers	N	Students' comments
Question 8		
Yes	2	○ I will search more information about the news or my own opinion. ○ No reason
No	26	
Question 9		
Yes	5	○ I think about what is true or false. ○ When I read the news I don't like, I try to judge the news. ○ I tried to read different information of the reporting about the war in Libya. ○ I tried to learn critical thinking from reading and TV. ○ My teacher in senior high school taught us about critical thinking by reading the media and writing.
No	23	

In investigating students' ability to apply critical thinking in media literacy after taking the course, students responded to question 8: Please connect critical thinking with reading and writing the media by using anything you learned in the course (Table 7.18). In spite of the missing and miscellaneous responses whose themes were difficult to be termed, most students learned to detect bias and seek alternatives in reading and writing the media:

> *When reading and writing the media, I will think more deeply and find out the implications of the news and if there is any bias which is not easily detected on the surface.*
>
> *Some news media use some strong and negative words to describe the news events, showing the ideas they do not support.*
>
> *We could improve our critical thinking when we discussed with our team members to exchange our different ideas.*
>
> *I learned to think more I never thought before and tried to find out differences.*

Students' responses included some interconnected ideas; for example, detecting bias can be related to problem-solving, and seeking alternatives is likely to be associated with analysis. In comparison with their responses in the pre-class questionnaire, students' comments in the post-class questionnaire tended to show that students were more capable of applying critical thinking in media literacy at the end of the course.

Table 7. 18 Students' responses to understanding critical thinking in media literacy via PBL from the open-ended question in the post-class questionnaire

Categories	N
Detecting bias	10
Seeking alternatives	9
Improving reading or writing skills	3
Confusion	1
Miscellaneous	4
No answers or irreverent answers	4

Students' perceptions of critical thinking as recognising different perspectives and seeking alternatives echoed their outstanding capability of seeking alternative points and sources of information in academic performance. Reflection on the wider context and self-reflection for which students scored the lowest, by contrast, was not mentioned in their responses to both pre-class and post-class open-ended questions. Although their understanding tended to be fragmented rather than holistic, no misperceptions were found from their answers to open-ended questions in the post-class questionnaire. Students perceived their improvement in understanding critical thinking and the contribution of PBL to their attainment of critical thinking in the way of working with peers. This can be proven from students' positive responses to the closed question 25 in the post-class questionnaire, where 71% of students believed the effectiveness of the PBL course in developing critical thinking to understand media literacy (Section 7.5.1.1).

7.6 Observations

Unstructured observations were conducted throughout the research process, where three less structured observations on students' first three presentations and three structured observations on one presentation, talk show, and group discussion after the midterm were used to examine each group's performance. In contrast to students' perceptions, observations from the teacher's perspective provided another angle of understanding students' learning. For analysis, the outcomes of less structured observations on students' first three presentations were displayed according to Kipping's (2000) four critical thinking components in media—questioning assumptions, detecting bias, analysing context, and seeking alternative information and Buckingham's (2003) four media literacy key concepts from the most simplistic level marked as 1 to the most sophisticated level marked as 5. The schedule of the structured observations corresponding to the critical thinking group presentation rubric was adopted to check frequencies of the items students manifested (Appendix H).

7.6.1 Less Structured Observations

At the beginning of the course, students were asked questions related to their real-life current events, some students pointed out the simplification and sensationalisation of news content in Taiwan and related the phenomenon to audience viewing rate. In class discussion, students agreed that news might be biased because of different standpoints and found it necessary to refer to various resources when reading or watching news. They were aware of questioning and the existence of bias and different positions.

From the observations of the first three presentations, the seven groups tended to put more emphasis on seeking alternatives (Appendix L.1). Groups one, three, and six advanced in questioning assumptions, detecting bias, and analysing context slightly time after time, yet groups two, four, and five regressed. With regard to the overall performance of applying critical thinking to media literacy, group three and group six made progress more significantly from the first to the third presentations

though there was a variety of differences in sophistication when it came to the four specific concepts of media literacy. Students were prone to focusing on the parts modified from their previous weaknesses but failing to tackle other parts. The teacher's field notes also suggested that students' performance might be in connection with their interest in and familiarity with the topics or teamwork.

7.6.2 Structured Observations

Referring to the demonstration of critical thinking capabilities, it was found that all the groups questioned ideas and assumptions but neglected to mention limitations of current thinking (Appendix L.2). In relation to applying critical thinking to key concepts of media literacy, students tended to deal with why some voices were heard or excluded and what was included and excluded from the media world but were not apt at analysing why audiences accepted some media representations as true, or rejected others as false and how audiences interpreted media. The capabilities students demonstrated corresponded to their higher academic performance in considering different perspectives, whereas the parts they did not explicitly address required professional knowledge, wider analysis, and the capability of deeper reflection to answer the why and how questions.

7.7 Discussion

The findings from students' academic performance, questionnaires, and observations suggested that the development was not a straightforward process, for the 'pace' and 'degree' of students' development varied. Students demonstrated capabilities significantly in considering alternatives, yet progress in other parts was not apparent. The development, however, was more or less moving forward. Noteworthy findings are listed as below:

1. From students' group presentations, it was difficult to find out a fixed pattern of development because of the up-and-down trend of scores. The outcomes might result from complex learning experiences in the process of working with others. The scores of their final group performance, however, were statistically significantly higher than those of the midterm assessment.

2. The fluctuant tendency of individual writing scores was also identifiable. Although there was no statistically significant difference between individual midterm and final writing, from the number of students, more students did make progress in their final. Most of the students' scores were concentrated around the transitional-preliminal knowing stage for lack of the ability to integrate ideas.
3. In comparing the midterm and final academic performance from t-test, students' group improvement was more manifest than their individual one. Statistically significant correlation was found between students' group and individual midterm works, but that in the final was not the case. The result could be interpreted in many ways, probably because students became more confident of expressing their individual ideas, making it difficult to achieve consensus in teamwork.
4. Students tended to demonstrate their ability to recognise different perspectives and ignored to reflect on the wider context and self-limitations, yet those at the independent-liminal stage demonstrated their potential for integrating various disciplinary ideas. This tendency was also found from students' perceptions of critical thinking development and the teacher's observations.
5. Characterising critical thinking tended to be easier than demonstrating critical thinking capabilities in this defined area, for the integrative ability was required in media literacy involving professional knowledge in various fields more than students' subject background.
6. They tended to perceive PBL as an effective strategy to develop critical thinking and approach different perspectives. A strategic pedagogical approach to developing students' gradual sophistication for achieving mastery is of significance.
7. Students' cognitive development involved affective and social aspects of learning in the PBL collaborative process.

The findings raised issues bound up with what students experienced in the learning process. Critical thinking is an ongoing process of encountering new challenges. Regression in scoring did not mean that they failed to develop their capabilities as

they continuously coped with emerging agendas. Group dynamics in PBL might either enhance critical thinking benefiting from exchanging various views or lead to the difficulty in consent. The transformative journey appeared to be troublesome given the use of the innovative approach to the attainment of the complex concept in the context relating to a variety of dimensions of issues. The teacher-researcher's reflection on the process will then come into focus in the next chapter.

Chapter 8 Results 3: How PBL Related to the Development of the Teacher's Facilitation of Developing Critical Thinking

8.1 Introduction

If students' learning journey is likened to be a race, the teacher plays the role of a cheerleader encouraging them to run to the finishing line. If the journey is like an adventure, the teacher could then be considered a guide. In facilitating students to pass the transitional crossroads through the ongoing learning spirals of knowing, reflecting, and stretching discussed in Chapter 3, I as the teacher-researcher also experienced transformation in epistemological, practical, and ontological dimensions associated with the development of their knowledge and understanding, capacity evolvement, and self-development. Adopting the shifting facilitation with reflective adjustment based on real situations, I observed and recorded students' and my own development in my field notes and weekly journals, which is the focus of this chapter.

Integral to PBL was the reflective process recording how the transition between the old and new states occurred. This chapter consists of my reflection on three interrelated dimensions of the PBL process: the process of problem analysis, the process of developing critical thinking capabilities in media literacy, and the process of collaborative work to see how these processes informed my facilitation throughout the transformative journey. On the basis of students' development of critical thinking capabilities and perceptions of the learning process from the findings of multiple data, I took a critically responsive stance on evaluation which did not rely on rigid data analysis of students' satisfaction assessment but nuanced accounts from the students' and my perspectives. The following three questions therefore arose:

1. How did students appraise my facilitation of the development of critical thinking through PBL?
2. How did I valuate my facilitation of developing critical thinking?
3. What lessons could be learned from teaching and learning in the PBL process?

From the answers, how my facilitation evolved became visible and the findings could be helpful to ponder the quality of teaching and learning.

8.2 The Process of Problem Analysis

Provided that the PBL process began from an 'ill-structured' problem, how 'open' the problem could be was a problem itself for the participants. As outlined in Section 3.4.1 of Chapter 3, I designed the problem scenarios for students to decide the issues and identify the problems they were interested in embarking upon. The students new to PBL, however, were bewildered by the ambiguity of the problems they defined, resulting in unclear direction and loose arguments. According to their responses to the open-ended question 9 about how I helped them in the learning process and question 10 about what I could do more or differently in the post-class questionnaire, students expressed their concerns:

> *After identifying a problem, the teacher could give us more suggestions to find out the answer and give the direction.*
>
> *She could help us to find out problems and solutions more accurately, to understand what we need to enhance.*
>
> *She could give us more examples about the homework.*
>
> *Maybe the teacher could provide more concrete steps about PBL.*

In contrast to the uncertainty, students also commented on the rich content for learning, such as various resources with my assistance in clarifying key points:

> *She gave us many alternative topics to choose from and helped us to focus on one direction because it was hard for me to decide the topic from a lot of resources.*

These contradictory responses complicate the situation where I endeavoured to facilitate students' learning during the problem analytic process. I believed that starting from their interests and life experiences might stimulate their motivation

to learn and thus raised questions at the beginning of the course to understand how they accessed the media and what kinds of topics were appealing to them (Appendix A). From simple to complex, the topics required deeper and wider knowledge as the process went on. Students' lack of knowledge of different issues was supplemented by my lectures on key concepts, giving examples and raising questions, together with feedback on their work on a regular basis.

Under the circumstances, students were prompted to learn new things, but some students tended to puzzle at dealing with complicated materials. The struggle for clarification existed in both research cycles, especially when they explored a new topic.

> *Maureen: We did not know what the teacher wanted. I knew what the teacher said in the evaluation, but it was another difficult task next time. (Midterm focus group interview: The teacher's evaluation: Unit of coding 4.3)*

> *Eva: I still do not think we really conducted our final project by applying PBL. Reading the feedback was not enough; maybe the teacher could give us more examples. (Final focus group interview: The teacher's evaluation: Unit of coding 1.8)*

A series of resources and feedback guiding them through the process might bring about students' confusion instead. What I thought of as support might not be what the students needed. Encouraging students to identify their own learning issues was hence a viable way because they could take charge of what they planned to learn and what information was required. According to Delisle's (1997) view of organising ideas mentioned in Chapter 3, students constructed their ideas for problem-solving and action-taking and sorted out the resources useful for their projects. Nevertheless, I noticed that some students referred to alternative news media not relevant to their learning agendas; rather, selection of supporting resources was random for the convenience of presenting different perspectives.

Given the flexible structure of PBL, some students tended to be muddled by how to proceed to deal with the problems. Despite students' affirmative appraisals of

how I facilitated through the journey from findings of focus group interviews, questionnaires, and journals, I found it overwhelming to tackle students' learning difficulties in studying their problems. Empathising with my students new to PBL, I strived to provide instructions and materials causing a heavy workload but struggled to loosen my hold on students' learning due to my concern about how much they could direct their own learning. Bearing the student-centred principle of PBL in mind, however, I adhered to the adjustable facilitation based on students' gradual progression. It appeared to be proven that at the end of the course, students improved in addressing problems through more powerful supporting arguments though the problem analytic process was akin to a winding road.

8.3 The Process of Developing Critical Thinking Capabilities in Media Literacy

The extent to which students engaged in accessing different kinds of news media in the PBL process played an essential part in nurturing critical thinking in media literacy. Being exposed to different news media provided students with the opportunity to compare, scrutinise, and reflect on distinct positions on reporting. I thus presented a range of media messages, encouraged their access, and raised questions for them to think and reflect. Students' responses to closed questions 1 to 10 about their news-reading habits and engagement in accessing different forms and sources of media in pre-class and post-class questionnaires did not change substantially, and they tended to affirm the contribution of PBL to learning media literacy (Appendix M). In answering the post-class open-ended questions 1 and 2, students could state more firmly why they referred to various media, including comparing views of different news media because of being aware of news media bias, learning to analyse, and updating information. 3 out of 31 students mentioned that the need for undertaking their presentations, assignments and journals was the driving force of continuous access to different news resources.

Without colliding with other ideas, students' subjectivity might dominate and lead to bias against opposing opinions. Frequent access to alternative news media, then, was not for the purpose of comparing views at a surface level but for probing the

stories by considering and evaluating the context in depth. Reporting her confusion during the PBL process discussed in the previous section, Eva who was stuck at the absolute-subliminal stage at the end of the course commented on her and her peers' use of critical thinking:

> *It was easier to collect information but hard to relate it to critical thinking because we had no idea about how to analyse. (Final focus group interview: Uncertainty: Unit of coding 1.5)*

Students' organisation of what they needed to learn in PBL was a critical thinking process per se. Given my view of critical thinking as a threshold concept in media literacy, students tended to rely on 'the teacher's answers', making it difficult to independently take over their work. I tried to elicit their own thoughts to construct their own meanings by continuously asking questions, but students appeared not to be responsive in the first cycle.

> *The teacher's journal (week 4): In the fourth class, I introduced the headlines and leads in news, aiming to provide basic knowledge for students to deconstruct news articles. I talked about news stories about the controversy over our government's plan for allowing importing American beef with meat additive to Taiwan for discussion. The complex issue caused the government's policy dilemma. Although I asked for what they thought, most students relied on receiving knowledge from my lecture instead of voicing their opinions probably for lake of contextual knowledge.*

> *The teacher's journal (week 5): After the first presentation, the common problem was that they focused on describing the events, and some just criticised emotionally. There was a lack of deep analysis which should be tied up with critical thinking in media literacy. I suggested that they go back to read the information in 'All about the course' in their online e-course folder and refer to the criteria for presentation and individual writing.*

I took the predominant role of instilling the concept of critical thinking in students at the beginning of the course but recognised the gradual sophistication of their

thinking and the necessity of facilitating them to move to a higher thinking level afterwards. In response to the knowing, reflecting, and stretching spirals activating students to pass transitional crossroads to a higher stage, the PBL pedagogical approach purported to enable students to move from awareness of different perspectives to idea-clarification and evaluation. As the findings in Chapter 6 suggested, nonetheless, some students found it troublesome to deepen their knowledge. I also discovered that identifying students' development between stages was difficult particularly when students were at the crossroads closer to the next phase. Students were thus invited to engage in reflection on their past learning and ponder what to do next at a metacognitive level. Through referring to the critical thinking capabilities rubric, students tended not to place emphasis on reflection on self and the wider context in their academic performance but expressed their critical thinking pertaining to media literacy in the journals, especially in the second cycle.

Lisa (group four): What is cultural imperialism of Apple Company? It has a powerful symbol easily identified…Through the media reports, Apple products have become popular. Some people are crazy about this brand, just like what they think of Lady Gaga. We must reconsider the information from mass media. Is it worthy to be crazy about? We should choose which information is better for us. (*Questioning the consumption of the media)*

Kenny (group seven): I was confused why they reported the same news all day long and ignored other important news. The reason might be viewing rate, but we have the right to know what happened in the world. That is really not fair to all the audiences. (Questioning the profits overriding the representation of diversity)

Gary (group three): In the movie 'Good Night, and Good Luck', the TV host Edward and the TV producer Fred used the media in the best way. They said that TV would become a light box if it lost the positive function. This means that media are very important to the public. If they cannot bring the positive power to the public, they are nothing…We should not stay in silence in our society and

should not be afraid of injustice. We have the right to speak the truth and know the truth. (Awareness of taking action triggered by injustice)

Jenny (group seven): News media may criticise some issues in a subjective way. Therefore, readers are unaware that the information they receive could be information bias. The bias against some issues can affect the readers' views of the world. (Awareness of the influence of media bias)

These four students whose epistemological development were at transitional-preliminal or independent-liminal stages demonstrated different dimensions of critical thinking capabilities in relation to media literacy. Although their subjectivity still existed, they became aware of the importance of justification by looking at a range of sources. Their improvement was also recorded in my journal.

The teacher's journal (Week 18): I was impressed by the progress my students made. They changed significantly from the beginning to the end of the course, from innocent thinking to more complex ideas. At first, they 'knew' the operation of news might not be straightforward as they expected but did not 'understand' how the media messages were constructed, for whom, for what. As the PBL curriculum went on, their thinking of analysing experienced transformation. Students at the transitional stage recognised different perspectives but were unable to stretch to achieve deeper understanding, while students at the independent epistemological stage demonstrated the great potential for integrating different disciplinary ideas although personal subjectivity was inevitable and required further justification.

The journey from mere 'knowing' to 'understanding' was proven to be transformative, troublesome, and integrative or bounded, echoing the characteristics of threshold concepts. It was also troublesome for me to facilitate students who were approaching the gateway to the next stage or between stages. Keeping journals as reflective writing in the portfolio based on critical thinking capabilities rubric therefore formed a systematic approach to monitoring students' learning journey and my facilitation (Lähteenmäki & Uhlin, 2012).

8.4 The Process of Collaborative Work

Another transformative and troublesome process was oriented around the collaboration between my students and me. This process involved emotional complexity including interest and anxiety throughout the journey. Students wrote in their journals:

> *Bonny (group six): This was the first course in this semester. I was really interested because I could learn more about news. However, I was worried about our presentation at the same time. It is hard to understand all the materials we will learn. I have to work hard.*

> *Toni (group six): Our teacher did her best to tell us the basic information about the lesson. We really learned a lot, but I felt tired after the class. After the teacher told us details about our report, I really felt that the course was very difficult for me because I seldom used critical thinking when I read news. Our classmates were so silent when the teacher asked questions, so was I.*

> *Anonymous student: I didn't prepare the presentation very well. It made me nervous, and I looked down at my draft. After that, I reflected on my stupid mistake. It was a good lesson for me to realise that it is necessary to make sure everything is under control.*

In the disconcerting collaborative environment, my first task was to establish a rapport with students. I observed that students felt it interesting to listen to my professional career experiences in the media field and were keen on knowing more about the stories behind the scenes. Beginning from these experiences, I linked to my prior profession and media literacy rooted in critical thinking and provided cases for students to consider. For example, the product placement marketing has been embedded not only in film and television programmes but also in news. The news media reported the 'advertising news' for profits, and the journalists might have to present the events through manipulation of production, languages, representations, and audiences though it might be ethically-flawed. Questions were then raised: 'Do you know that advertising is ubiquitous in today's society?' 'Can

you offer any similar cases?' 'Who will be affected? How?' 'Do you think it is appropriate? Why?' 'If you were the journalists, what would you do?' In addition to expressing their opinions, students were also curious about how I reacted before. For the business sake, it was tricky to balance journalistic ethics and what the commercial media targeted, such as sensational footage which might lead to higher audience rating and more profits from advertisement, not to mention the political power involvement in the media management. I stressed why I believed media literacy was so important.

This example shows the possibility of conversational learning between my students and me, combining the professional discipline and reality-based experiences. In order to scaffold students' learning at a deeper level, I aimed to promote working in a 'relaxing' environment where students could enjoy talking with me rather than a 'freezing' atmosphere where I might merely talk to myself. However, I also noted that building the 'comfort zone' between students and me was not straightforward, for it required interpersonal intelligence communicating with people with different strategies, such as empathising with students' situations and inspiring their thinking. My prior educational background as an English major akin to students' and professional background as a journalist, in this case, might have been useful.

Students were on tenterhooks, working together with their peer-friends and me as the teacher-facilitator in the PBL research process. It would be unrealistic to assert that the conversational learning could eliminate their anxious suspense; rather, my multi-layered role as an instructor passing on knowledge, an assessor evaluating students' academic performance, and a tutor working with them might have influenced the affective aspect of their learning journeys. Wayne who expressed his misgivings in his journal presented in Section 6.4.2 of Chapter 6 befriended me at the end:

> *Thank you for teaching us this semester. I am so glad to have a great teacher like you. We could see your efforts at the PowerPoint you did and remember the content of every class you told us. Hope we can keep in touch on the Internet.*

What he wrote might be either adulation or an affirmative appraisal for me, yet one year after the completion of the PBL curriculum, he did realise his hope of contacting and talked about my facilitation through email:

> *In your class, we all had many opportunities to speak our opinions out. It was a good experience to learn our speaking and be brave to speak although we often made faults in grammar. We learned how to think about the same issue from different sides. Now I respect other opinions different from mine.*
>
> *We think that your role could be distinguished into two parts. One was an observer. You gave us a situation, asking us for discussing, and we proposed our ideas and solutions. The other one was a person who led us and gave us some information about further discussion and feedback…Sometimes we were stuck with an issue. You always suggested us some other ways to think. It is a good way for students because as university students, we should learn how to speak our opinions out. The most important abilities for an adult are individual thinking and team work. I learned these skills useful for life from the PBL media class.*

The skills he learned were regarded as transferable capabilities applicable in real life. Throughout the collaborative learning journey, my students and I transformed in how we dealt with knowledge, developed capabilities, and saw ourselves.

8.5 The Teacher's Epistemological, Practical, and Ontological Development

Critical thinking through PBL entails the ability to reflect on the self and context, as well as the past and now to illuminate the future. I intending to foster students' critical thinking based on a top-down rubric was required to involve self-appraisal and be enlightened from students' experiences because the way of my teaching reflected my belief and attributes. I believed that PBL could be a viable strategy to develop critical thinking requiring a cluster of capabilities of making appropriate judgements for achieving media literacy. The intricate journey was applied to not only the students but also me. My transformation calling for evolving knowledge and capabilities revolved around the following three dimensions:

1. The understanding of knowledge of core concepts;
2. The competence to implement the pedagogical approach in the collaborative work;
3. The identity shift pertinent to the relationship between my students and me.

8.5.1 The Teacher's Epistemological Development

The concept of critical thinking was a threshold for me to cross in order to embark on this research in the defined area of study. I was convinced that critical thinking was the core of media literacy given the importance of the competence to understand, analyse, evaluate and make appropriate judgements in deconstructing media messages. Combining the prior profession and the education discipline at both theoretical and practical levels, I endeavoured to design the curriculum by employing the PBL pedagogical approach to enhancing critical thinking, as discussed in Chapter 2 and 3. From reviewing what was done, reflecting on the implementation process, taking action to work with students, to adjusting the schedule, the journey transformed my thinking. My bias against the news media was obvious initially and implemented the curriculum to help students confront the 'media disorder'. Through exchange of ideas with students and colleagues associated with continuous reflection, nevertheless, I modified ideas and gradually built blocks as a theoretical framework addressing the empirical work, with a continuing attempt to strengthen the structure. I recognised that media information might not be categorised as right or wrong but required critical thinking as a ruler to measure, depending on individuals' development. Although I appeared to have a grip on the schedule and assessment, I was by no means the expert in critical thinking. The transformative journey was indefinite; every piece of gain from teaching and research constituted valuable experiences enriching my understanding. The present study based on my teaching experiences might then be refined by any further research, either in the same or different disciplines, for critical thinking implies change and challenge, as argued in Chapter 2.

8.5.2 The Teacher's Competence Development

No teachers would say that they are absolutely competent at managing pedagogy because nothing can be completely under control. Although I arranged the schedule and provided the PBL procedure for students, being on the right track was not guaranteed. As presented in Chapter 6, students were either excited or confused about learning critical thinking through PBL in the media context, leading to emotional complex which was beyond my expectation. I thus exerted interpersonal skills to establish the sense of trust and implanted teaching in real-life conversations where exchange of feelings and thoughts were possible, as specified in Section 8.4.

In order to familiarise my students with critical thinking through PBL, I provided lectures and examples from media resources related to class topics in the first cycle; in the second cycle, activities like talk show and group discussion were added for students to be self-directed by determining what and how to do themselves. With students' increased sophistication in thinking, my facilitation was correspondingly adjusted and loosened. From the transformative teaching process, I realised that the cyclical scaffold model of teaching and learning comprising the teacher's scaffolding, students' developing, collaborative evaluating, and presenting could be feasible. Lack of any of the elements might result in insufficient elaboration of the problem analysis. For instance, as Section 7.2.4 of Chapter 7 showed, students' midterm group work tended to miss the evaluation of the contexts of their chosen issues probably due to time limitation and the ignorance of discussion with me. It appeared that the scaffold model might take effect during in-class discussion; however, working with all of the seven groups was time-consuming, making it difficult to complete the scaffold discussion during the class period. This was not the case in the final group work because I regularly reminded students of deciding what the cases and problems they would study, what resources they needed, reflecting on learning and what the deadline was for submitting concrete ideas from the beginning of the second cycle.

Allocating student tutors or making use of the online discussion might help to enhance their knowledge, but whether the student tutors were qualified or how much time students were willing to work together with me online needed to be considered. Recognising the drawbacks of this study, I became more aware of what could be improved in any further research opportunity.

8.5.3 The Teacher's Ontological Development

I exerted my influence on my students to proceed with their PBL work and took advantage of my role as a teacher and a researcher for study. In response to the adjustable facilitation from tight to loose grip, my students and I were becoming accustomed to my multi-faceted roles between which a distinction was hard to be drawn.

According to my observations, at the initial stage of the first cycle when students and I were not familiar with each other, I was treated as the authority passing on knowledge. During the classes, I provided feedback to students, pointing out what students needed to improve, and students accordingly modified their projects. My role was an assessor evaluating their performance. Entering the second cycle, students were more acquainted with me and the learning environment, so more interaction emerged. For example, I drew on the 2005 drama film *'Good Night and Good Luck'* directed by George Clooney to invite students' thoughts about media bias. Some students talked about media responsibility, while others took notice of the audience's awareness of critically assessing the media. Although a few students mentioned the difficulty in understanding the political ideological conflict between the television journalist and the anti-Communist senator, they all agreed that voices of dissent should not be oppressed. During the talk show, students became the hosts taking charge of their own programmes, and I acted as a viewer watching their performances. Students tended to enjoy the process of design and asked for my opinion given my professional background. I did not intervene but scaffolded by giving suggestions about building structure of their creations. In this phase, I was like a consultant offering advice.

In this process, I also noticed that students experienced relative transformation in identity, from information-recipients, developing learners, to independent learners. In response to the critical thinking epistemological threshold framework established in Chapter 2, the teacher-student relationship connected with states of students and their knowledge transformation were identified in Table 8.1.

Table 8. 1 The relative transformation in the ontological relationship between students and the teacher-researcher

Transformative stages	Relationship between students and the teacher-researcher	States of learners	Knowledge transformation
Contextual knowing / post-liminal mode (External dependence< internal independence)	The teacher-researcher as a mentor-facilitator vs. students as confident learners	Knowledge constructors	Evaluating and critically integrating various perspectives to make new meanings
Transitional crossroads level 3			
Independent knowing / liminal mode (External dependence < internal independence)	The teacher-researcher as a consultant vs. students as independent learners	Knowledge assessors	Analysing and integrating various perspectives to construct meanings
Transitional crossroads level 2 (External dependence ≒ internal independence)			
Transitional knowing / preliminal mode (External dependence > internal independence)	The teacher-researcher as a transitional instructor vs. students as developing learners	Knowledge appliers	Recognising alternative sources of meaning and trying to compare and select
Transitional crossroads level 1			
Absolute knowledge / subliminal mode (External dependence > internal independence)	The teacher-researcher as an authoritative instructor vs. students as information-recipients	Knowledge acceptors	Being dominated by personal assumptions based on external influence

Active learners<--------Passive learners

According to the findings of this study, no students reached the highest stage; my role of mentor-facilitator was derived from the inspiration of Wayne's response (Section 8.4). As students gradually abandoned their personal assumptions and

explored or integrated alternative ideas to construct their meanings, the ontological relationship between my students and me shifted though the change might be implicit. The transformative relationship may not be generalised to every student or case owing to the uniqueness of the particular context of this research; following the oscillatory nature of learning, the multiple roles might overlap.

8.6 Discussion

The race adventure of learning also spurred me as a contestant to move forward. The accumulation of professional knowledge and practical working experiences over time led to the undertaking of this research, transforming me in epistemological, competence, and ontological dimensions of teaching development. PBL allowed the implementation flexibility providing me with the opportunity to adjust on the basis of the real situations. Through the processes of problem analysis, developing critical thinking, and collaborative work, I thus facilitated students to learn and pass the crossroads with different strategies. The transformative journey, however, was never straightforward; the strategies might be applicable to one student but not another. My task was to be sensitive to the pedagogical threshold and reflected on the past and now in order to improve in the future.

In learning, PBL blurred the boundary between my students and me, while in teaching, it also created the challenge for me to decide how much intervention should be involved. As established in Chapter 3, the PBL implementation flowed from simple to complex topics, from tight facilitation to loose facilitation, with reflective adjustment. As students' sophistication increased, they would be more capable of taking charge of their own study. Given the top-down design of the PBL curriculum in the media literacy context, nonetheless, I was likened to be the controller of the curricular content and assessment. Although students tended to be become more independent and viewed my role in different ways as previously presented, the shadow of a traditional teacher transmitting knowledge seemed to exist throughout the research.

It was unrealistic to argue that my PBL facilitation met every student's need in accordance with variations in learning, yet the value rested on my students' and my reciprocal learning process and unprecedented development. The transformation I underwent was inseparable from the development of my knowledge, competence, and self-identity in conjunction with cognitive, affective, and social aspects of students' learning. For my students and me, the journey akin to a race adventure was ongoing with obstacles in the way to stride across and levels of goals to achieve.

PART III:

CONCLUSION

Chapter 9 Conclusion

9.1 Introduction

It might be constructive to refer back to the title of this thesis in order to frame this current chapter in trying to draw conclusions and explore pedagogical implications. Developing critical thinking in media literacy through PBL suggested that the attainment of critical thinking was a developmental process from abandoning old assumptions, considering various ideas, to making new meanings for the action research participants in the higher education classroom setting. It was predicted on an assumption that the change occurred as an integrated process of meaning construction, hinging on variations in learning and layers of sophistication. The process also implied selecting and making choice requiring the abilities to recognise alternatives, clarify, evaluate, and justify. The student participants in this study acquired the capabilities based on the critical thinking epistemological threshold framework embracing the conceptual and practical domains and demonstrated their epistemological, practical, and ontological development.

Drawing on the theories of the epistemological reflection model (Baxter Magolda, 1992), threshold concepts (Meyer & Land, 2003a), and educational spaces of higher education curriculum design (Barnett & Coate, 2011), this empirical research represents an integration of theory and action research. From the theoretical framing to the application of a pedagogical approach, this research was informed by literature and subsequently enriches the field by providing nuanced illustrations in the disciplinary context of media literacy. The findings showed that the students never attained critical thinking in a smooth or uniform way, and they experienced cognitive and affective shifts in the socialised learning context influenced by the use of PBL as a pedagogical tool.

This concluding chapter reflects on how the findings from this study fit with the theoretical framework (developed in chapter 2) by highlighting the critical thinking epistemological threshold framework used as the rubric to identify students' conceptual and practical development. PBL as a pedagogical vehicle to enhancing

critical thinking was implemented with learning spirals of knowing, reflecting, and stretching and the teacher's scaffolding cycles, in the hope of facilitating students to pass the threshold. The empirical work is then reviewed in response to three research questions: 1) How did the students experience their learning of critical thinking in media literacy in the PBL process? 2) How did students' critical thinking shift? 3) How did PBL relate to the development of the teacher' facilitation of developing critical thinking? This section discusses the significance of using this approach. Through the findings from students' learning experiences and academic performance, the teacher-as-researcher reflects on pedagogical implications for higher education theoretically, empirically, and methodologically, proposes an integrated critical thinking reflexive framework for future practice, and considers the limitations of this study.

9.2 The Rationale for the Critical Thinking Framework in this Study

Living in the fast-changing world where advances have been made in media technology, people are faced with information transmitted from a diversity of sources. In educational settings, cultivating critical thinking to understand the media is an important task for teachers. At the policy level, developing critical thinking has thus been identified as a mission in media literacy in Taiwan. Recognising critical thinking as a core in media literacy, the study set out to investigate the extent to which PBL contributed to the attainment of critical thinking in the higher education context. The rationale behind this study was built on the premise of characterising critical thinking in accord with the educational objectives of mobilising knowledge to higher thinking stages for practical use in the broad sense and the disciplinary area of media literacy specifically. The link between the macro and micro levels was illuminated by threshold concepts qualified as 'conceptual gateways' by Land et al. (2010, p. ix) in terms of the epistemological, ontological, and practical development.

It was made clear in Chapter 2 that the critical thinking framework was concerned with the logic, competence, developmental shifts, and contextual influence approaches that formulate the capacity to respond to philosophical, psychological

and sociological traditions. Philosophy provides a significant foundation for understanding the concept of critical thinking. Scientific enquiry and reflective thinking arising from Dewey's (1910) theory account for investigation with evidence in the meaning-making process, underpinning the theoretical essence of critical thinking. Authors in the logic and competence camps incline to endorse this essence. Psychology, on the other hand, is concerned with cognitive skills development which facilitates educators to understand learner performance. Bloom's (1956) hierarchical taxonomy can serve as the representative example. Sociology concerns learning empowerment and the relationship between teaching and learning. Vygotsky's (1978) contention of the joint construction in meaning features the achievement of higher levels of knowing through social interactions. Encapsulating from the three traditions and four approaches, this study defined critical thinking as a threshold concept requiring a cluster of productive capacities for making appropriate judgements as well as a purposeful learning process. It was useful to refer to Baxter Magolda's (1992) epistemological reflection model with four stages from absolute to contextual knowing as the base for constructing the critical thinking framework because this model integrates the previously mentioned perspectives and builds a dynamic structure of understanding students' development for the purpose of instruction and assessment. Her model is strengthened by self-authorship based on constructivist-developmental theory integrating epistemological, intrapersonal, and interpersonal dimensions of development from dependence on external sources, crossroads, to internal position (Barber et al., 2013; Baxter Magolda, 2009; Boes et al., 2010).

The developmental perspective of learning is echoed by Meyer et al.'s (2008) modes of variation with four progressive phases from subliminal to postliminal variation. The combination of the epistemological reflection model and modes of variation lays the foundations for investigating the extent to which different students understood critical thinking at the conceptual level. The threshold capabilities notion (Baillie et al., 2013) further embodies critical thinking at the practical level to visualise critical thinking capacity (Moon, 2008) students demonstrated in the media literacy context. In the learning process with periodic

and layered objectives, students might experience epistemological, practical, and ontological dimensions of development, resonating with educational spaces in higher education curriculum design advocated by Barnett and Coate (2011). Students' development in knowledge, capabilities, and identity consisted in their progression of critical thinking as a threshold concept and accordingly required the PBL threshold vehicle for pushing learning forward. In consideration of the flexibility of PBL, as presented in Chapter 3, this study proposed knowing, reflecting, and stretching spirals and the cyclic scaffold model involving the teacher' scaffolding, student's proposing and developing, collaborative evaluating, and presenting, embedded in the PBL approach. Drawing on Baxter Magolda's theory and the idea of threshold concepts, the research emphasised that learning and development were interconnected, involving progression of cognitive skills and students' changing relationships with peers and the teacher in respect to the affective and social domains.

Critical thinking through constructivist PBL serves as a gateway to mastery of media literacy which entails 'analysis, evaluation and critical reflection' (Buckingham, 2003, p. 38). As argued in Chapter 4, media literacy requires two modes of knowledge as the base giving rise to competence: critical thinking as a core concept and production, languages, representations, and audiences as content-based knowledge. Media literacy reacts to critical thinking as a transformative process from acceptance, awareness, clarification, to evaluation and an objective that can be achieved. In the researched class, various topics under the themes of *news media and propaganda* and *news media and views of the world* were provided for students to decide their preferred study. These topics were chosen by the teacher according to students' interest and real-life cases and not independent from each other. From simple to complex, different topics were instalments of a story, and students were writers selecting, integrating, and constructing the meaning to complete their work. Recognising the possible difficulties students might encounter in the learning process, the teacher adopted tight facilitation with instruction in background knowledge such as news worthiness and media production in the first cycle of action research, while the facilitation was loosened

in the second cycle, aiming to empower students to take charge of their study more independently. The flow of the facilitation, though, was not linear but adjustable and subject to the actual learning situations. The context for this study is reviewed and synthesised in Table 9.1.

Table 9. 1 A review of the context studied

Context	Descriptions	Features
Research aim	Developing critical thinking through PBL in the media literacy class	Using the critical thinking epistemological threshold framework with four stages comprising conceptual and practical levels
Space & Time	media literacy classroom & 18 weeks- one semester	Concentrating on student demonstration of critical thinking capabilities in relation to the four key concepts of media literacy— production, languages, representations, and audiences
Target	35 third and fourth-year undergraduate English majors divided into seven groups	Investigating the extent to which different groups and individual students manifested the critical thinking capabilities
Strategy	PBL knowing, reflecting, and stretching spirals with the facilitative scaffold cycles	The teacher assisted students in passing crossroads with dynamic facilitation based on reflective adjustment.
Outcome	The students' and the teacher's transformation	Transformation in epistemological, ontological, and practical dimensions tied up with cognitive, affective, and social aspects of learning

9.3 Results from Responses to Three Research Questions

The aim of this study was not teaching about critical thinking but developing student capacity for critical thinking through PBL, the pedagogical vehicle, in the defined area of media literacy. 35 Taiwanese undergraduates majoring in English participated in the two-cycle action research undertaken with multiple methods, including focus group interviews, questionnaires, and class observations. Students' academic performance was assessed according to the critical thinking epistemological threshold rubric on the group and individual bases. Their responses were gathered in response to four dimensions: 1) the ways students thought PBL contributed to the attainment of critical thinking; 2) what they considered to be the difficulties and problems in learning; 3) their perceptions of understanding critical thinking and developing critical thinking capabilities, and 4) how the students appraised the teacher's facilitation of the development of critical

thinking. The findings in conjunction with the teacher's observation yielded the learning pattern, and the teacher and students reflected on the process through weekly journals to minimise the teacher-researcher's bias. The following sections highlight the main findings and implications rather than reiterating the details in Chapter 6, 7, and 8.

9.3.1 Responses to Research Question One: How Did the Students Experience Their Learning of Critical Thinking in Media Literacy in the PBL Process?

Students reported their impression of the PBL curriculum, key features of PBL, and learning difficulties during the midterm and final focus group interviews. Cognitive, affective, and social domains were involved as they revealed their perceptions. As analysed in Chapter 6, students' impressions were majorly positive, and most students stated their improvement in knowing, with the emphasis on recognising different views. In contrast to the result that only 2 students mentioned *positive interaction in teamwork* in the midterm focus group interview, 7 students articulated the benefits of working in teams to develop critical thinking in the final focus group interview.

On the other hand, students tended to struggle in negotiating different ideas and communicating with group members, especially in the second cycle after the midterm. Throughout the research, students were confronted with the difficulties in learning in terms of complicated materials, uncertainty of the direction, and unfamiliarity with new topics. Various resources provided by the teacher were thus either support for their study or impediment to their idea-clarification. The degrees of difficulty varied because of different conditions of the seven groups' and individual students' understanding. Their responses particularly revealed the complexity of working in a group, for stimulating thinking and difficulty in reaching consensus both occurred in teamwork.

Students reflected on their learning journey in their weekly journals at the metacognitive level. Group dynamics influenced and accelerated some individual

students' development although it might not be the case for everyone. In the learning journey, some students were inclined to dwell on uncertainty which might hinder the possibility of making progress, while others chose to break through the difficulties with the use of strategies such as continuously modifying original ideas and gradually integrating alternatives. Their responses also suggested the subtleties of the teacher's facilitation calling for flexibility with tactics according to different circumstances.

9.3.2 Responses to Research Question Two: How Did Students' Critical Thinking Shift?

Students worked with peers throughout the PBL process. As Figure 9.1 presents, the findings in Chapter 7 showed the oscillatory learning curves of the six group presentations, including three presentations and the midterm presentation (horizontal axis value 4) in the first cycle and one presentation and the final presentation (horizontal axis value 6) in the second cycle. The highest scores were concentrated on the final assessment, with another peak at the point of the midterm assessment. The outcome appeared to suggest the resilient nature of bouncing back to a higher point of achieving understanding after declining to a lower point. It also suggested that students tended to place more importance on the formal assessment as the last chance of raising their overall scores in this class.

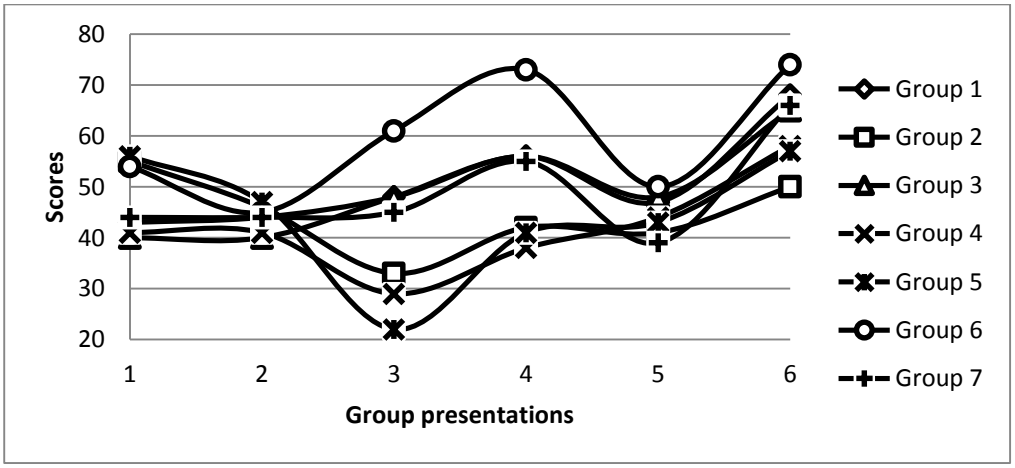

Figure 9. 1 Group oscillatory learning curves

In applying t-test, the mean score of the groups' final assessment was statistically significantly higher than that of the midterm; by contrast, the statistically significant difference was not found between the individual final and midterm mean scores. Most students stayed at the transitional-preliminal stage at the end of the course, indicating their initial perception of critical thinking. Referring to the six categories of critical thinking capabilities, students' academic scores were the highest in seeking alternative points and sources of information and questioning assumptions but the lowest in self-reflection and reflection. Between students' group and individual performance, a statistically significant correlation was found in the midterm but not in the final. Table 9.2 shows their transformation collaboratively and individually.

Table 9. 2 Students' transformation in the midterm and final group and individual academic performance

Transformative stages	Scores	Midterm scores Group (n = 7) Individual (n = 35)	Final scores Group (n = 7) Individual (n = 35)
Contextual knowing / postliminal mode (External dependence< internal independence)	Group: above 80 Individual: above 90 (90-100)	Group (n = 0) Individual (n = 0)	Group (n = 0) Individual (n = 0)
Transitional crossroads level 3			
Independent knowing / liminal mode (External dependence < internal independence)	Group: 70-79 Individual: 80-89	Group (n = 1) Individual (n = 5)	Group (n = 1) Individual (n = 4)
Transitional crossroads level 2 (External dependence ≒ internal independence)			
Transitional knowing / preliminal mode (External dependence > internal independence)	Group: 60-69 Individual: 70-79	Group (n = 0) Individual (n = 15)	Group (n = 3) Individual (n = 21)
Transitional crossroads level 1			
Absolute knowledge / subliminal mode (External dependence > internal independence)	Group: below 60 Individual: below 70 (60-69)	Group (n = 6) Individual (n = 15)	Group (n = 3) Individual (n = 10)

From students' responses to the questions in questionnaires, as presented in Section 7.5.2 of Chapter 7, they tended to acknowledge their improvement in understanding critical thinking and applying critical thinking capabilities in media literacy. Their responses to the open-ended questions showed that they viewed the most distinct feature of critical thinking as independent thinking both at the beginning and the end of the course despite that they also valued collaboration in teamwork during the process. Through PBL, the most manifest critical thinking capabilities in media literacy were detecting bias and seeking alternatives.

The teamwork nature of PBL appeared to bring about the tension between students' individual and collective ideas. Recognising that working together was beneficial to learn different perspectives on interpreting one issue, students demonstrated the efforts they made and significantly ameliorated in thinking particularly in the last phase. Individual development, by contrast, was not apparent given variations in learning situations though more students made progress at the end of the course.

9.3.3 Responses to Research Question Three: How Did PBL Relate to the Development of the teacher' facilitation of developing critical thinking?

As discussed in Chapter 8, the teacher-researcher reviewed her facilitation in the processes of problem analysis, developing critical thinking capabilities in media literacy, and collaborative work. What the students lacked needed to be complemented by the teacher's assistance in encouraging them to identify their own learning issues and reflect on their learning process. They experienced seesawing emotions involving interest, worry, anxiety, and hopefulness, and the teacher made use of conversational learning drawing on her previous educational and professional background and real-life experiences to talk with the students and raise questions for them to think, discuss, and respond in a comfort zone.

Students' explicit responses in talks and writing and implicit responses through emotions unfolded the relative transformation in the ontological relationship between the teacher and students though it was difficult to identify a clear-cut distinction between the multiple roles. In addition to the ontological

transformation, the teacher-researcher also experienced epistemological and competence development, enriching her knowledge and practical capabilities of teaching and researching. However, it was also recognised that the process of critical thinking development might not merely be cognitive, affective, and social but also political given the top-down approach to the examination. The researcher believed that the teacher assumed responsibility for aiding students in making their own meanings based on her professional knowledge and experiences; through the reciprocal learning between the students and the teacher, mobilising knowledge and activating capabilities applied to real life could be possible.

9.4 Significance of this Study

Putting critical thinking into practice is a way of avoiding falling into abstraction. The theoretical and pragmatic layers embedded in critical thinking enrich the content of critical thinking. In retrospect, the findings in this empirical study are summarised below for considering the significance or importance of the study using theoretical, pragmatic, and methodological lenses.

1. Students' performances fluctuated but generally headed towards a forward direction. → The learning curve of critical thinking is oscillatory.
2. Students demonstrated critical thinking capabilities through stages and improved significantly at the end of the course. → Critical thinking learning is a transformative process.
3. Given the complexity of the concept of critical thinking through PBL, students encountered problems in the attainment of critical thinking. → Critical thinking revolves around troublesome knowledge.
4. Students demonstrated the potential for understanding new areas of study after the exploration of related topics. This finding showed students' capacity for integrating other fields. Their problem-solving proposals also showed the creative aspect of thinking. → Critical thinking capabilities can lead to integration with other disciplines, which may call for creativity.
5. From students' group academic performance, they tended to have lower scores in reflection and self-reflection, yet those groups and individuals with higher

scores tended to be able to reflect more deeply. → It is more likely that reflection accompanies higher-order stages of knowing although the relation is not guaranteed.

6. Students experienced cognitive development in relation to their affective and social aspects of learning with variations in group and individual performance. → The cognitive, affective, and social domains of learning are related.
7. Students kept on modifying and revising their academic work based on the teacher's feedback. Although they made progress, they reflected the need of the teacher's assistance. → PBL is a student-centred strategy, but the teacher's strategic facilitation or scaffolding is also of significance.

The findings were derived from students' academic performance based on the critical thinking epistemological threshold framework built in Chapter 2 and perceptions of their development and learning experiences. Theoretically, the core concept of critical thinking combines philosophical, psychological, and sociological traditions covering the logic, competence, developmental shifts, and contextual influence approaches to suiting the higher educational context. The critical thinking framework is thus context-oriented, but given the generic inclination of critical thinking, the illustration of the developmental stages in the defined framework can be flexibly adjusted to fitting any particular disciplinary field with distinct emphases. 5C characteristics of critical thinking resonate with the features of threshold concepts; the research hence integrated Baxter Magolda's (1992) epistemological reflective model with Meyer and Land's (2003a) threshold concepts and Meyer et al.'s (2008) modes of variation from the developmental perspective to investigate students' transformation at the conceptual level. This structure embodies the theoretical base leading to explicit capabilities and is useful for assessing students' epistemological development.

Critical thinking capabilities illustrated by Moon (2008) can be elucidated by Baillie et al.'s (2013) Threshold Capability Integrated Theoretical Framework (TCITF) concerning knowing, practising, and doing. Inspired by these previous works, the research then adopted an ongoing learning spirals of knowing, reflecting, and stretching, aiming to assist students in passing the crossroads to the

next stage. Knowing reflected the degrees of students' understanding of critical thinking. Reflecting referred to their abilities to reflect on their learning process and plan to depart for the next journey. Stretching denoted their capacity for integrating different ideas and making new meanings. In applying in the PBL process, this study used the scaffold cycles involving the teacher's scaffolding of students' idea-structure, the students' solution-proposing and organisation-developing, collaborative evaluation of arguments, and presenting ideas for action with adjustable facilitation based on learning situations. Rather than use 'problem solving skills to teach content' or 'content to teach problem solving skills' (Wismath, Orr, & Mackay, 2015), this research merged critical thinking with content to design problem scenarios for solutions. The practice suggested that the elasticity of the epistemological threshold framework allows for the flexibility of PBL as a pedagogical approach to enhancing transferable competence within and across disciplines.

This study shares Lipman's (2003, p. 20) 'community of enquiry' and Moseley et al.'s (2005, p. 301) 'community of practice' where both the teacher and students participate in exploration. Methodologically, classroom action research was employed because the aim of this study was not to control any result but to investigate happenings in the classroom setting. Any innovative curriculum requires not only the teacher's fertile planning but collaboration between the teacher and students as participants in a community. Though taking the lead, the teacher as a reflective-practitioner endeavoured to 'facilitate' rather than 'instruct' students to proceed their work, discussed with them and made adjustments in implementation.

It was assumed that lack of the background journalistic knowledge and vocational experiences was likely to make it difficult for the students in this study to achieve critical thinking in media literacy at higher stages. This was not the case following the undertaking of this research, for students demonstrated critical thinking capabilities to different degrees, including the independent-liminal stage where they actually tackled critical thinking. The development might not be made explicit, yet students transformed in thinking from accepting, analysing,

evaluating, understanding, to meaning-constructing. They particularly manifested their critical thinking capacity for referring to different perspectives of broadening their outlook and detecting bias in media. Possessing content knowledge and practical experiences could enhance critical thinking but is not a promise. For those working in the media field, it might not be guaranteed that they are all critical thinkers; however, attaining critical thinking capabilities in this media literacy class could be a boost to students' future professional life. For example, situating herself as a reflective audience in the media world, Jenny in group seven whose midterm and final individual academic performance was at the independent-liminal stage wrote in her final writing task:

> *Some Taiwanese media usually report negative news about China. It may create stereotyping or prejudice against the Chinese and affect Taiwanese views of the world... To find a solution, we should assess different news resources. The pro is that people can broaden their views, but the con is that they may still choose particular media they are interested in but ignore others. Misunderstanding is one of the factors of stereotyping. The best way is to avoid making prior assumptions before understanding.*

Her understanding might help her to develop professional knowledge in her future career life. On the basis of real-life experiences and cases, the ongoing knowing-reflecting-stretching learning spirals associated with the facilitative scaffold model in this study could thus be of use to promoting critical thinking in media literacy.

9.5 Implications for Practice

PBL not only requires a systematic design and plan for implementation but also considers the flexibility in actual practice. In the classroom-based settings where the teacher takes the lead, trained group tutors or team leaders could be appointed as intermediaries assisting team members in proceeding with their projects and keeping up with what and how they learn. The teacher might also work with colleagues to validate the findings and reflect on the pedagogy for future curricular improvement. The collaborative work outside of the classroom, nonetheless, needs

technical preparations such as training the tutors, negotiating with other teachers or staff, and organising the curriculum. It might overcome the difficulties in practice, including the teacher and students' heavy workload and discrepancy in understanding real learning situations.

Even so, every research might have emerging problems never expected; referring to this study, the reflective process played a pivotal part in progression. Through oral reflection in discussions and keeping journals, students had the chance to rethink what they learned and how they could improve. However, not every student was prompted to regularly record their learning; creating a responsive e-portfolio through online system and encouraging students to participate could be a good option. Provided that collaborative dynamics in PBL also implies responsiveness, the teacher should be sensitive to exercising different strategies to work with students. According to the empirical results in the media literacy class, drawing on the teacher's professional background and real-life experiences to connect with the cases studied in the classroom could be useful. Constructing a responsive atmosphere through conversational learning was therefore emphasised in the PBL process.

This process gave rise to the teacher and students' epistemological, practical, and ontological development. In putting the critical thinking epistemological threshold framework to good use in particular disciplines, appropriate adjustment based on different contexts is thus of necessity in association with the recognition of the previously mentioned. The practice in this defined study worked on the premise that attaining higher-order stages of critical thinking required students to relate knowledge to coping with uncertain situations to eschew being manipulated by the news media in the introversive way and take action for solutions or change based on appropriate judgements in the extroversive way.

9.5.1 A Proposed Reflexive Framework

Not until I engaged in the actual conduct of this study could I realise what the spirit of teaching, learning, and researching is. Teaching and learning are not taken-for-granted giving and taking, and researching is not merely reporting the results through methodological instruments. They all resonate with the 5C characteristic reflection of critical thinking; in essence, they are referred to as transformative journey. Through ongoing refinement, they can be more sophisticated and appropriate for the changing environment. This section, accordingly, attempts to propose a critical thinking reflexive framework synthesising the epistemological threshold framework, empirical findings, and my reflection on the implementation of this curriculum where teaching and learning occurred.

There has been a trend that critical thinking is not confined to thinking critically per se but extended to embrace the capacity for connecting to the world through high-standard morality (Lipman, 2003) or radical reconstruction (Barnett, 1997; Johnston et al., 2011). This study supports this moral concern but emphasises sophisticated knowing resulting in adequate competence as the foundation because without mature knowledge and capabilities, meaningful action cannot be taken. As established, knowledge involves critical thinking as the core and content-based knowledge as the background, leading to capabilities for mastering disciplines and integration. In this regard, students are unlikely to consider different views only from the texts rather than the contexts. With the deep consideration of different frames of reference, the transferability of abilities to deal with different issues is likely to be demonstrated.

Students moved through developmental stages in a progressive order but were likely to be stuck or return to a regressive stage because of a variety of reasons such as the complexity of deconstructing a new topic. This regression during engagement, though, did not mean that students lost certain critical thinking capabilities; rather, their stuckness suggested new challenges yet to be tackled. With the ongoing learning spirals of knowing, reflecting, and stretching facilitated by the teacher's scaffold cycles involving the teacher's and students' collaborative

work for refinement, resilience of understanding recurred. Following the completion of this research, the critical thinking reflexive framework was developed (Figure 9.2).

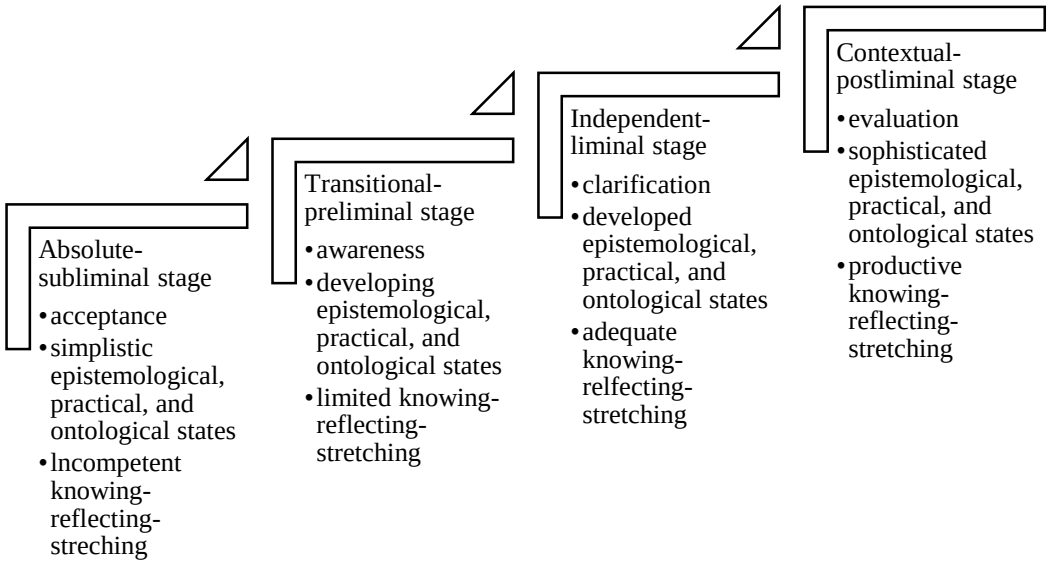

Figure 9. 2 The proposed reflexive critical thinking framework

This simplified reflexive framework is based on the critical thinking epistemological threshold framework, the PBL knowing-reflecting-stretching framework, and empirical results from this study. It requires the integration of the given principles and particular disciplinary concepts, for example, how sophisticated practical state is demonstrated and how the productive knowing-reflecting-stretching framework is implemented in a defined area to form more concrete criteria. This framework gives primary weight to both knowledge and competence, recognising the transformative nature of learning. The degree of sophistication does not follow a rigid order because transformation implies entering an unknown territory where the old and new conceptions may be blurred. This framework stems from this research and is thus subject to evolution because there might be equivocal parts which need to be modified and elaborated from further implementation.

9.6 Limitations of this Study

Having discussed the significance of the study and practical implications, this section focuses on the limitations of conducting this research in the light of the PBL and action research process from empirical and methodological perspectives. For the acquisition of critical thinking, PBL might either enhance the capacity or lead students to a misty island with helplessness without the teacher's proper guidance. Although adjustable facilitation was employed, the teacher found it overwhelming to notice every student' need, especially when working with students was confined to the two-hour class every week. E-course online system provided for students, though, was more like a one-way transmission of information from the teacher. Students were not keen on making full use of the resource, probably because they were not required, or used, to communicate with the teacher in this way. Another issue arising from time pressure pertained to the wide range of information provided in this course. For the sake of freshness and diversity, the extensive and varied topics and resources became a burden for some students instead of a source of support. Students were not given sufficient time to deeply explore their study, making it difficult to run through knowing, reflecting, and stretching; that is, the knowing-reflecting-stretching spirals were difficult to be completely implemented for the two main reasons: 1) the limitation of time for the teacher to respond to each individual student's need for adjustment, and 2) the diversity of topics leading to a new start of knowing, which tended to temporarily obstruct the road to transferring to another higher stage. This was also the case for the implementation of the scaffold cycles, as discussed in Section 8.5.2 of Chapter 8. This might result in the teacher's ignorance of students' actual learning problems and the gap between the teacher's and students' perceptions of understanding the learning process.

The difficulty in the achievement of assessment objectivity was recognised because the teacher was the only assessor. In order to avoid the affective influence on assessing the results, the teacher-as-researcher was committed to the established evaluation criteria for marking of which students were notified at the beginning of this study. However, it could be ambiguous to identify which stages students

arrived at when they were at the transitional levels. The teacher then returned each of the assessment results to students for verification. The necessity of continued reflection on assessment procedures for modification was further taken into account, along with evidence drawn from different sources for validation. The researcher also acknowledged the inherent risk of bias, such as the chosen sample, several missing data, and the situation that students might be reluctant to answer some questions for different reasons. Given that action research does not entail stiff instruments but subtle insight, the researcher drew on multiple methods, materials from different perspectives and self-reflection to overcome bias. For example, metacognitive capacity was not explicitly demonstrated, but in students' journals, they expressed thinking about what they learned, the interaction between the teacher and peers, and reflection on the wider context based on their life experiences. The researcher interpreted the findings in the way that adequately corresponded to the situations at that time although the interpretations of the findings are open to different opinions.

9.7 Concluding Remarks

Inspired by Sherlock Holmes's deductive logic and discourse, the researcher agreed that knowledge could be selective and integrated for the practical purpose, relying on the degree of sophistication. This study, however, not only intended to solve problems in teaching and learning but hoped to make new meaning. Critical thinking with the embedded theoretical and pragmatic layers is not reduced to but covers the logic and competence, leading to capabilities required for understanding in disciplines. The modes of variations in learning critical thinking from the developmental perspective serves as the base explaining the resulted capabilities practical for the news media literacy context. Building a bridge to connect the path through the theoretical level to the empirical level requires triggers including a student-centred strategy and the teacher's facilitation. This study shed light on developing critical thinking in media literacy through PBL and found the curriculum workable for stimulating students' shift from identifying a problem to presenting the solution although the learning outcomes were not straightforward but oscillatory. This learning journey proved transformative, troublesome,

integrative, implicitly bounded and irreversible, referring to the characteristics of threshold concepts. The threshold process is a process of adjustment from forsaking misconceptions, evaluating and integrating ideas in view of realisation, to discovering the 'light bulb' illuminating the road to understanding the threshold concept. This research hence did not highlight the mechanical purpose but the process of students' development in stretching knowing to the wider world. In response to the three theoretical traditions, this study underscores philosophy of reasoning and rationality, psychology of cognitive development in enhancing the problem-solving capacity, and sociology of understanding the social contexts which interact with individuals' ways of thinking, values, and beliefs.

Higher education provides the platform for mobilising knowledge, on the basis of which the evolution of the modern world is underway. This Western concept of critical thinking is not incompatible with the Eastern context where 'democratic class' is being drawn valuable attention in the current environment. Not only for the students but also for the teacher, nurturing critical thinking is an ongoing transformative journey of reciprocation which signifies productive construction of meaning. The achievement of critical thinking capabilities lies in continued refinement of existing knowing. At the pedagogical level, developing critical thinking in news media literacy through PBL encouraged students to understand world issues in the classroom, but it was hoped that the knowledge and capabilities learned in class could be stretched to the real world for new meaning-making. This hope is not an unrealistic ideal but ambition, and the researcher believes that completing this thesis is also a periodic objective leading to opening the portal to the next stage. The prevalence of the critical thinking curriculum further requires collaboration of extended agents in the broader context. At the pragmatic level, industry-academy cooperation might be of assistance in reinforcing students' practical experiences and transferability of critical thinking capabilities learned in the classroom. At the academic level, working with the academic communities or the higher education institutions in relation to trans-disciplinary, trans-cultural, or trans-national research could provide the forum on the ways of enriching the quality of teaching and learning.

Appendices

Appendix A: Students' Responses to Pre-Class Questions about Their Knowledge of Media and Topics Appealing to Them

Questions	Responses (N = 35)
1. 1) What do you think the most influential means of media is?	• Electronic media including television, radio, or the Internet (n = 11) ➔ Students tended to choose television as the most influential medium. Among these 11 students, one student also recognised the influence of newspapers. • No particular medium (n = 24)
1. 2) Do you think it affects our views of the world?	• Yes (n = 30) • No (n = 2) ➔ Student answer 1: I don't think the media completely affect our views of the world. It's necessary to analyse on our own but not follow the media blindly. ➔ Student answer 2: Somehow the media may affect our views, but we should think critically as some of the news is not true at all. • No opinion(n = 3)
2. 1) From which medium do you most receive news information?	• Television (n = 11) (Among these students, four students also chose the Internet.) • Internet: (n = 18) (Among these students, one student also chose the newspaper.) • Newspaper (n = 4) • No opinion (n = 7)
2. 2) What is your impression of news in Taiwan? Please describe your feeling when you watch or read news.	• Positive (n = 2) (quick and effective, interesting and amazing)) • Negative: (n = 25) (exaggerated, violent, repetitive, boring, local, unfair…) • No opinions (n = 4) • Others (n = 4) (The media are controlled by political parties; People cannot live without it; People believe the news is true.)

3.	1) In the areas of *news media and propaganda* as well as *news media and views of the world*, what are the subjects that you are most interested in investigating respectively?	• Clearly indicating the area of news media and propaganda (n = 1) • Clearly indicating the area of news media and views of the world (n = 2) • Both (n= 1) (beautiful places and delicious food & the relationship between Taiwan and other countries) • Subjects without indicating any specific theme (n = 21) (entertainment, sports, culture, news about aliens, politics, life, fashion, social events) • No opinion (n = 11)
3.	2) How much do you know about them?	• No opinion (n = 20) • A little (n = 10) • Knowing but not indicating how much (n = 2) • Nothing (n = 1) • A lot (n = 1)(politics) • Others (n = 1) (Answer: I will watch TV news first. If I need more information, I will google online.)

Appendix B: Critical Thinking Capabilities Rubric

B.1. The Rubric for Assessing Students' Individual Writing

Evaluation criteria adapted from Baxter Magolda (1992), Buckingham (2003), Kipping (2000), Meyer, Land, and Davis (2008), and Moon (2008, pp. 198-201)

Criteria **Individual marks**	**Excellent** above 90 (90-100)	**Good** 80-89	**Satisfactory** 70-79	**Poor** below 70 (60-69)
Stages	**Contextual knowing-postliminal**	**Independent knowing-liminal**	**Transitional knowing-preliminal**	**Absolute knowledge-subliminal**
Questioning assumptions ↕ **Production, Languages, Representations, Audiences**	There is clear questioning of ideas and assumptions; most obvious mulling over. Assumptions are examined. Self-questioning and possibly self-challenge is evident.	There is appropriate questioning of the ideas and assumptions; some obvious mulling over. Assumptions are examined.	Assumptions for analysis may be noted or questioned, but they are not explored in depth.	There is little questioning. Assumptions are likely to be left unexamined and probably unnoticed.
Detecting bias ↕ **Production, Languages, Representations, Audiences**	The account may recognise that the issue exists in a historical or social context that may be influential on the response to the task. In other words, multiple perspectives are recognised and taken account of.	There may be recognition that things might look different from other perspectives; that views can change with time or the emotional state. The existence of several alternative points of view may be acknowledged, though not necessarily fully analysed.	There may be some comparisons made between ideas but probably no more than two ideas at a time.	It may provide a narrative account which is from one point of view, in which generally one point at a time is made.
Analysing context ↕	There is an introduction of the issue, an examination	It is not a straightforward account of an event, but it is	There is some attempt to recognise the task and	Ideas tend to be linked by the sequence of the account

Production, Languages, Representations, Audiences	of the wording (e.g. meanings and assumptions) or context of it, as appropriate. It may be reinterpreted so that it can be more clearly analysed. The context, purpose for or limitations of the current thinking may be mentioned. The selection of the evidence for examination is appropriate and sufficiently wide-ranging.	definitely reflective and analytical and it seems more intentionally designed and focused. The issue is introduced and probably the wording is explored in order that any deeper meaning or assumptions can be elicited.	broadly, but still descriptively, structure the material towards the reaching of some sort of conclusion.	rather than by meaning and there may be no overall structure and focus.
Seeking alternative points and sources of information  **Production, Languages, Representations, Audiences**	It shows deep reflection, and it incorporates the recognition that the frame of reference or context within which the issue is viewed, could change and affect the conclusion.	There is evidence of external ideas or opinions and, when it occurs, the material is subjected to reflection and consideration in relation to the task.	There may be some drawing in of additional ideas, reference to alternative viewpoints or attitudes to others' comments, but these are not explored in depth or focused on in working through the issue towards a conclusion.	There may be ideas or external information, but these are not considered in depth or integrated.

B.2. The Rubric for Assessing the Group Presentation

Evaluation criteria adapted from Baxter Magolda (1992), Buckingham (2003), Kipping (2000), Meyer, Land, and Davis (2008), and Moon (2008, pp. 199-201)

Criteria **Group marks**	**Excellent** Above 80	**Good** 70-79	**Satisfactory** 60-69	**Poor** Below 60
Stages	**Contextual-postliminal**	**Independent-liminal**	**Transitional-preliminal**	**Absolute-subliminal**

Group No.: _____

Criteria	**scores**					
Rubric— Students should be able to	**0**	**1**	**2**	**3**	**4**	**5**
introduce the topic clearly with adequate structure	0	1	2	3	4	5
identify the problem appropriately	0	1	2	3	4	5
include learning issues	0	1	2	3	4	5
collect information from various resources	0	1	2	3	4	5
question ideas and assumptions	0	1	2	3	4	5
involve self- questioning and possibly self-challenge	0	1	2	3	4	5
recognise that the issue exists in a historical or social context that may be influential on the response to the task	0	1	2	3	4	5
recognise and consider multiple perspectives	0	1	2	3	4	5
Examine meanings and assumptions or context of an issue for analysis	0	1	2	3	4	5
reinterpret so that the issue can be more clearly analysed	0	1	2	3	4	5
mention the context, purpose and limitations of current thinking	0	1	2	3	4	5
select evidence appropriately and sufficiently	0	1	2	3	4	5
reflect deeply	0	1	2	3	4	5
incorporate the recognition that the frame of reference or context within which the issue is viewed, could change and affect the conclusion	0	1	2	3	4	5
include action plan	0	1	2	3	4	5
relate the issue to the key concepts in media literacy	0	1	2	3	4	5
analyse from questions about production	0	1	2	3	4	5
analyse from questions about languages	0	1	2	3	4	5
analyse from questions about representations	0	1	2	3	4	5
analyse from questions about audiences	0	1	2	3	4	5

Appendix C: Research Ethics Form and Consent Form

C.1. Research Ethics Form

Durham University

School of Education

Research Ethics and Data Protection Monitoring Form

Research involving humans by all academic and related Staff and Students in the Department is subject to the standards set out in the Department Code of Practice on Research Ethics. The Sub-Committee will assess the research against the British Educational Research Association's *Revised Ethical Guidelines for Educational Research* (2004).

It is a requirement that prior to the commencement of all research that this form be completed and submitted to the Department's Research Ethics and Data Protection Sub-Committee. The Committee will be responsible for issuing certification that the research meets acceptable ethical standards and will, if necessary, require changes to the research methodology or reporting strategy.

A copy of the research proposal which details methods and reporting strategies must be attached and should be no longer than two typed A4 pages. In addition you should also attach any information and consent form (written in layperson's language) you plan to use. An example of a consent form is included at the end of the code of practice.

Please send the signed application form and proposal to the Secretary of the Ethics Advisory Committee (Sheena Smith, School of Education, tel. (0191) 334 8403, e-mail: Sheena.Smith@Durham.ac.uk). Returned applications must be either typed or word-processed and it would assist members if you could forward your form, once signed, to the Secretary as an e-mail attachment

Name: Dai-Ling Chen Course: EdD

Contact e-mail address:

Supervisor: Julie Rattray; Richard Smith

Title of research project: Problem-based Learning and critical thinking: an action research for a class of media literacy

Questionnaire

		YES	NO	
1.	Does your research involve living human subjects?	■		IF NOT, GO TO DECLARATION AT END
2.	Does your research involve only the analysis of large, secondary and anonymised datasets?		■	IF YES, GO TO DECLARATION AT END
3a	Will you give your informants a written summary of your research and its uses?	■		If NO, please provide further details and go to 3b
3b	Will you give your informants a verbal summary of your research and its uses?	■		If NO, please provide further details
3c	Will you ask your informants to sign a consent form?	■		If NO, please provide further details
4.	Does your research involve covert surveillance (for example, participant observation)?		■	If YES, please provide further details.
5a	Will your information *automatically* be anonymised in your research?	■		If NO, please provide further details and go to 5b
5b	IF NO Will you explicitly give *all* your informants the right to remain anonymous?			If NO, why not?
6.	Will monitoring devices be used openly and only with the permission of informants?	■		If NO, why not?
7.	Will your informants be provided with a summary of your research findings?	■		If NO, why not?
8.	Will your research be available to informants and the general public without restrictions placed by sponsoring authorities?	■		If NO, please provide further details
9.	Have you considered the implications of your research	■		Please provide full details

	intervention on your informants?			
10.	Are there any other ethical issues arising from your research?		■	If YES, please provide further details.

Further details
As a teacher and researcher, I chose action research as the research methodology because I intend to explore whether problem-based learning strategy contributes to the effectiveness of teaching in critical media literacy class. Through identifying the problem and taking action, I hope that my students who are also my informants and I will discover how to improve teaching and learning in the form of collaborative learning. Since action research is a form of self-reflective enquiry, I have to be clear about the theory and practice and use my own experience to review what happens in the classroom. In sum, in this study, there are essential parts to bear in mind: the purpose, participants, the setting, equipment used, the reliability and validity of the measurements, procedure and design, analysis and conclusion. Finally, it is hoped that through my intervention with multiple methods, students are able to understand the importance of critical thinking and further apply it to real life.

Continuation sheet YES/NO (delete as applicable)

Declaration

I have read the Department's Code of Practice on Research Ethics and believe that my research complies fully with its precepts. I will not deviate from the methodology or reporting strategy without further permission from the Department's Research Ethics Committee.

Signed: Dai-Ling Chen…… Date: 10/March/ 2011……

C.2. Consent Form

Consent form

Title of Project: Developing critical thinking through problem-based learning: an action research for a class of media literacy		
The participant should complete the whole of this sheet himself/herself.	Please delete if necessary	
Have you read the Participant Information Sheet?	YES	NO
Have you had an opportunity to ask questions and to discuss the study?	YES	NO
Have you received satisfactory answers to all of your questions?	YES	NO
Have you received enough information about the study?	YES	NO
Who have you spoken to? Dr/Mr/Mrs/Ms/Prof. ..Dai-Ling Chen.....		
Do you consent to participate in the study?	YES	NO
Do you understand that you are free to withdraw from the study: * at any time and * without having to give a reason for withdrawing and * without affecting your position in the University?	YES	NO
Are you aware of and do you consent to the use of video recordings?	YES	NO
Participant signature:		
Date:		
NAME IN BLOCK LETTERS:		

NOTES:

1) **If you intend to make tape recordings or video recordings of participants, your consent form should also include a section indicating that participants are aware of, and consent to, any use you intend to make of the recordings after the end of the project.**
2) **The information sheet should contain the statement 'Approved by Durham University's Ethics Advisory Committee' when approval has been given.**

Appendix D: The Schedule of Action Research Data Collection in Response to the PBL Process

Weekly schedule	Class activities	PBL data collection	Research data collection
Theme one: News media and propaganda			
Week 1: Newsworthiness	Lecture + discussion	The teacher's and students' journals	Pre-class questionnaire + The teacher's unstructured observation with field notes
Week 2: 1. Breaking news—introduction 2. News and propaganda—case discussion	Lecture + discussion Students started to practice identifying the problem of the cases.	The teacher's and students' journals	The teacher's unstructured observation with field notes
Week 3: English language newspapers and news sources	Students established teams for conducting PBL projects.	The teacher's and students' journals	The teacher's unstructured observation with field notes
Week 4: The secret language of headline and lead— the example of iPhone news	Students proceeded to conduct their first PBL presentation.	The teacher's and students' journals	The teacher's unstructured observation with field notes
Week 5: 1. The body of news 2. Features and opinion articles	Students' first presentation and individual analytic writing + revision after the teacher's feedback	The teacher's and students' journals	The teacher's unstructured observation with field notes + Less structured observation
Week 6: The impact of technology	Students' second presentation and individual analytic writing	The teacher's and students' journals	The teacher's unstructured observation with field notes + Less structured observation
Week 7: Advertising	Students proceeded to conduct their third PBL presentation.	The teacher's and students' journals	The teacher's unstructured observation with field notes
Week 8: Discussion over midterm projects	Students' third presentation and individual analytic writing + the teacher's feedback	The teacher's and students' journals	The teacher's unstructured observation with field notes + Less structured observation
Week 9: Midterm projects	Midterm group presentation and individual analytic writing + reflection on		Midterm focus group interview

	the teaching and learning process		
Theme two: News media and views of the world			
Week 10: Media bias	The teacher reminded students of their previous limitations and the following PBL projects.	The teacher's and students' journals	The teacher's field notes
Week 11: 1. Conspiracy theory 2. McCarthyism and television	Students practised identifying problems and attempted to consider learning issues.	The teacher's and students' journals	The teacher's field notes
Week 12: Film discussion— *Good night, good luck!*	Students reflected on learning based on their life experiences related to television news and its responsibility.	The teacher's and students' journals	The teacher's field notes
Week 13: 1. Stereotyping 2. Reading discussion: *Freedom fighter or terrorist?*	Students' fourth presentations and individual analytic writing	The teacher's and students' journals	The teacher's structured observation + field notes
Week 14: Students' talk show based on the topic of stereotyping	Students' talk show	The teacher's and students' journals	The teacher's structured observation + field notes
Week 15: Cultural imperialism	Students' group discussions	The teacher's and students' journals	The teacher's structured observation + field notes
Week 16: Media and globalisation	Students' group discussions with the teacher	The teacher's and students' journals	The teacher's field notes
Week 17: A final check of the progress of students' final projects	Students' proceeded with their final projects.	The teacher's and students' journals	The teacher's field notes
Week 18: Final projects	Final group presentation and individual analytical writing		Post-class questionnaire + Final focus group interview

Appendix E: Focus Group Interview Questions

E.1. Midterm Focus Group Interview Questions

Introduction
First, introduce yourselves: tell us your name, age, degree, and your interests. Second, please tell us what you expected before taking this course and what you hope to do after graduation if you have any idea.

In the Beginning
1. Think about the day you learned at the beginning of the course. How did you feel and what made you decide to continue to learn?
B. After you formally took this course, what is your overall impression?

Learning
1. Please give me a general comment on your classroom learning experiences.
2. Have you got any best and worst experiences? If so, what were they?
3. Among the topics you learned under the theme of *news and propaganda*, which was the topic that interested you the most? Why?
4. Do you think you applied problem-based learning to conducting your media project? Do you think it was helpful for your content knowledge of media literacy or developing critical thinking? Why?
5. Was working in groups to conduct your PBL project helpful for the development of your critical thinking? Why?

Teaching
1. Do you understand what PBL is? How do you relate it to the teacher's facilitation? What do you think your teacher can facilitate you?
2. Do you think you have demonstrated critical thinking because of the teacher's facilitation? Why?

News Media Class Expectations
At this point in time, to what extent have your experiences in this class met your expectations or failed to meet what you hoped to learn?

E.2. Final Focus Group Interview Questions

Introduction
First, introduce yourselves: tell us your name.

In the Beginning
After you formally finished this course, what is your overall impression?

Learning

1. Please give me a general comment on your classroom learning experiences.

2. Have you got any best and worst experiences? If so, what were they?

3. Among the topics you learned under the theme of *news and propaganda* and *news media and views of the world*, which was the topic that interested you the most? Why?

4. Compared with the first cycle, do you think conducting PBL in the second cycle was *more* helpful for your content knowledge of media literacy *or* developing critical thinking in reading and writing the news media? Why?

5. Was working in groups to conduct your PBL project helpful for the development of your critical thinking? Why?

Teaching

1. Do you understand what PBL is? How do you relate it to the teacher's facilitation? What do you think your teacher facilitated or could have facilitated you?

2. Do you think you have demonstrated critical thinking because of the teacher's facilitation? Why?

News Media Class Expectations
To what extent have your experiences in this class met your expectations or failed to meet what you hoped to learn?
Do you think what you learned in this class is helpful to your real life or future? Why?

Appendix F: Questionnaire

F.1. Pre-class Questionnaire

How much do you agree with the following statements? Please circle one number.

	Agree strongly	Agree slightly	No opinion	Disagree slightly	Disagree strongly
1. I like to read or watch news.	5	4	3	2	1
2. I read or watch news every day.	5	4	3	2	1
3. I like to read newspapers better than watch television news.	5	4	3	2	1
4. I like to watch television news better than read news online.	5	4	3	2	1
5. The most accessible way of knowing current events is to read news on the Internet.	5	4	3	2	1
6. I read news from electronic media more than from print media.	5	4	3	2	1
7. I read or watch news because I know it is important to know what is happening in the world.	5	4	3	2	1
8. I read or watch news because I want to know what is happening to celebrities.	5	4	3	2	1
9. I prefer local news.	5	4	3	2	1
10. I prefer international news.	5	4	3	2	1
11. I understand that news messages are constructed.	5	4	3	2	1
12. I understand how news is gathered.	5	4	3	2	1
13. I understand how news is presented.	5	4	3	2	1
14. I heard critical thinking before.	5	4	3	2	1
15. I know what critical thinking is.	5	4	3	2	1
16. I know the importance of critical thinking in understanding the media.	5	4	3	2	1
17. I question ideas or assumptions in media messages.	5	4	3	2	1
18. I understand what bias is in media messages.	5	4	3	2	1
19. I analyse media context.	5	4	3	2	1
20. I seek alternative points and sources of information when reading the media.	5	4	3	2	1

21. I understand the production of media.	5	4	3	2	1
22. I understand how meaning is conveyed through the media.	5	4	3	2	1
23. I understand how media represent particular groups.	5	4	3	2	1
24. I understand how the media speak to audiences.	5	4	3	2	1
25. I believe understanding how media production, languages, representations, and audiences interact is related to critical thinking.	5	4	3	2	1

Open-ended questions:

1. How often do you read news?
2. Where do you usually get your news from?
3. What kind of news articles do you usually read? For example, do you usually read articles about politics, business, entertainment, etc.?
4. What attracts you to read an article most?
5. Describe your reading habits: when reading news, I usually_____ (for example, I just scan the headlines or look at the photos.)
6. If you think that critical thinking is important, please describe why.
7. What is your definition of critical thinking?
8. Can you connect critical thinking with reading and writing the media? If yes, please explain.
9. Have you learned to use critical thinking in reading and writing the media? If yes, please describe more details.
10. If you have no idea about how to use critical thinking in reading and writing the media, are you willing to learn in this class? Please explain why.

F.2. Post-class Questionnaire

How much do you agree with the following statements? Please circle one number.

	Agree strongly	Agree slightly	No opinion	Disagree slightly	Disagree strongly
1. I am more interested in reading and watching news because of taking the course.	5	4	3	2	1
2. I read or watch news more often than I did before taking the course.	5	4	3	2	1
3. I understand the difference of contents between electronic and print media more than I did before taking the course.	5	4	3	2	1
4. I understand print media have developed online versions to face the crisis of being challenged.	5	4	3	2	1
5. I enjoy the convenience of reading online news and also consider the impact of technology on our life.	5	4	3	2	1
6. I read print news as well as electronic news.	5	4	3	2	1
7. I read or watch news because I understand keeping up with the world is essential to my life.	5	4	3	2	1
8. I also understand the function of entertaining is important to the media.	5	4	3	2	1
9. I find it useful to learn news media and propaganda via PBL in the media literacy class.	5	4	3	2	1
10. I find it useful to learn news media and views of the world via PBL in the media literacy class.	5	4	3	2	1
11. I understand how to analyse news messages after taking the course.	5	4	3	2	1
12. I understand how to analyse the way news is gathered after taking the course.	5	4	3	2	1
13. I understand how to analyse the way news is presented after taking the course.	5	4	3	2	1
14. I understand what critical thinking is after taking the PBL course.	5	4	3	2	1

15. I find it helpful to understand critical thinking via PBL.	5	4	3	2	1
16. I understand the importance of critical thinking in media literacy via PBL.	5	4	3	2	1
17. I always question ideas or assumptions in media messages.	5	4	3	2	1
18. I am able to detect bias in media messages.	5	4	3	2	1
19. I am able to analyse media context.	5	4	3	2	1
20. I am able to seek alternative points and sources of information when reading the media.	5	4	3	2	1
21. This course helps me to understand the production of media.	5	4	3	2	1
22. This course helps me to understand how meaning is conveyed through the media.	5	4	3	2	1
23. This course helps me to understand how media represent particular groups.	5	4	3	2	1
24. This course helps me to understand how the media speak to audiences.	5	4	3	2	1
25. The PBL curriculum is effective in developing my critical thinking in media literacy.	5	4	3	2	1

Open-ended questions:

1. Do you read news more often than you did before taking the course? Why or why not?
2. Do you get your news from different resources after taking the course? Why or why not?
3. What do you think of learning news media and propaganda via PBL?
4. What do you think of learning news media and views of the world via PBL?
5. What do you think of learning media literacy via PBL?
6. Describe your understanding of critical thinking after taking this course.
7. Do you think PBL helps you understand and develop your critical thinking? Why or why not?
8. Please connect critical thinking with reading and writing the media by using anything you learned in this course.
9. What do you think of the ways in which your teacher/ facilitator has helped you in the learning process?
10. What do you think your PBL teacher/ facilitator could do more or differently to assist you in learn critical thinking?

Appendix G: Midterm Class Survey

Midterm Class Survey

Please circle yes or no to show if you agree with the following statements. Also, use examples to explain why.

Some responses are listed as below:

1. Yes/ No

Do you agree that newsworthiness decides the importance of events in daily news? Pleas draw on any example to explain and relate it to media literacy.

yes	no
N = 24	N = 11

Yes:

- **Audience-**

  - News should be attractive to audience.
  - The most important news is always put in the front for people to remember.
  - Audiences pay more attention to their national news because they are related to their daily life.
  - If one news event is reported again and again, people should be attracted.
  - Newsworthiness can decide the significance of events in daily news. News media need to report accurate information and definitely convey news concepts to audiences. In fact, news should also educate citizens.

No:

- Events are more important.
- The news media think the news of Jeremy Lin is important, but I don't think so.
- After we repeat reading and watching news about Jeremy Lin, it becomes worthless.
- News about superstars from paparazzi does not have any connection with our life.
- Newsworthiness depends on what the audiences like and their preferences.
- Newsworthiness is to give the audience something meaningful instead of repeating broadcasting.
- Newsworthiness is not about how strongly something is reported.
- The importance of events depends on everyone. It does not have a clear answer.
- Some relaxing news is also important.

2. Yes/ No

Do you think that news items connected with the concept of propaganda are easily detected? Why do you think there is news propaganda?

yes	no
N = 31	N = 4

Yes:

- **Connection with life-**

  - Sometimes we can see the news about traffic jam and the increase of oil price, and then we will find the propaganda telling us to take MRT (Mass Rapid Transit) more often.
  - For example, when I read the news about global warming, it comes to my mind that there are many people who do not do recycling.
  - If news is connected to propaganda, it should also be connected to people's life easily.
  - News propaganda connects with our life like the cars and petrol price increase.

- **Advertising-**

  - People often associate it with advertisement in Taiwan.
  - If something is reported repeatedly, it is like advertising.
  - Media report some interesting events from some companies or restaurants. It not only can help the media have different news but also can help restaurants to propagandise their special.
  - Many restaurants spend money inviting news media to report in order to raise the awareness, and audiences pay attention to those stores.
  - Some celebrities are invited to speak for some products, but it is not necessarily the truth.
  - News about movies or dramas involves propaganda.
  - To raise the viewing rate

- **Particular groups-**

  - Most news media are supported by sponsors because they need capital to do business.
  - Take the *Liberty Times* as an example, they obviously support DPP (Democratic Progressive Political Party).
  - Some political parties use the news media to propagandise their thinking to people.

No:

- It is hard to guess if some news is about propaganda or not.

3. <u>Yes/ No</u>

Do you agree that different news media have different standpoints? How do you think their standpoints affect their interpretations of news?

yes	no
N = 35	N = 0

Yes:

- **Bias-**

  - News reporting is like two sides of a coin, and particular views cause bias.
  - I think media should keep neutral. They shouldn't affect readers' thinking.
  - They cannot give the audiences objective views.
  - We can trace back to the news media's background to know the reason.

- **Political inclination-**

  - Some of the news media are operated by some political parties, and they reflect what their views are.
  - If the news media always incline to one political party, it will affect the development of news.
  - Because of supporting different political parties, their interpretations of news will also be different. They will definitely affect audiences' views.
  - In Taiwan, most of the media support their preferable political standpoints. Because of this, they tend to report the good sides of the political parties they support, so the readers may receive different reports of the same news.
  - They have bias and tend to protect some political parties.
  - Some people only choose particular media to get information based on their preference or political inclination.

- **Audience-**

  - Each of the media has their loyal audiences, and their standpoints will affect their audiences.
  - Their standpoints reveal their subjective opinions, and they may influence the readers.
  - I hope the standpoints of news media are good for people, not for news companies.
  - News media have different standpoints, but I think media should remain neutral.

4. <u>Yes/ No</u>

Do you think it is easy to get the main ideas from reading the headlines? Why do you think so?

yes	no
N = 25	N = 10

Yes:

- **Attractive-**

  - People like to read headlines before they read the articles to find what they are interested in. Therefore, the media always come up with a special and easy way to catch readers' eyes.
  - If the headlines are not clear, it will be hard for the audiences to get the point. If the news can't catch the audiences' attention, they will lose their audiences.

- **Condensed or easy to understand**

No:

- **Exaggerated or sensational**
- **Distorted**
- **Superficial**

5. <u>Yes/ No</u>

Do you think it is easy to expect what the news articles are going to tell you from reading the leads? Why do you think so?

yes	no
N = 26	N = 9

Yes:

- The lead provides a summary of the story.

No:

- The leads only tell us little information about news, and we can't know the whole story until we finish reading the article.
- A lead is a part of the news, and you have to read the whole article to understand the context.
- I think every person has his or her ideas to interpret news.

6. <u>Yes/ No</u>

Do you think reading features is interesting? Why do you think so?

yes	no
N = 25	N = 10

Yes:

- **Interesting-**
  - There are many themes in the features. Some themes are interesting and related to our life. We can also use the information in our life effectively.
  - I like to read features about my favorite singers or something fashionable.
  - Features are appealing to readers.
- **Detailed-**
  - I can obtain more information.
  - I can learn more details about the events.
- **Reflective-**
  - It let me understand the truth.
  - It inspires me to understand the knowledge and connect to other things.
  - It makes me realise the events more.
  - I usually read features conveying something new or about the reflection of social phenomena.

No:

- **Boring-**

    - Features are always boring for me.
    - I don't think it is an interesting way because I like to learn more about the details.
    - I am more interested in the latest news.

7. <u>Yes/ No</u>

Do you think reading opinion articles is interesting? Why do you think so?

yes	no
N = 25	N = 10

Yes:

- **Different perspectives**
- **Attractive**
- **Stimulating-**

    - It stimulates thinking, which can help us make progress.

No:

- **Different perspectives-**

    - I can read many different opinions, but I won't be affected by others. And I don't think it's interesting.

- **Biased-**

    - Some writers give their biased opinions in the article. This cannot make the reader read the truth.

- **Boring**

8. <u>Yes/ No</u>

Do you agree that technology determines our life? Use any example to explain why you think so.

yes	no
N = 34	N = 1

Yes:

- Our life becomes more convenient because of technology.
- I can't live without technology like cellphones or the Internet.

No:

- The more advanced technology is, the lazier people are.

9. <u>Yes/ No</u>

Do you think the commercialisation of news is a common phenomenon? Use any example to explain why you think so.

yes	no
N = 31	N = 4

Yes:

- Business and the media are mutually beneficial.
- Some superstars or singers use the way to enhance their popularity.
- Some news companies will report the events of well-known companies. People will know the products via media.
- Products can be introduced through advertising in news.
- Some news media report stories about restaurants to attract consumers.
- News media can get funds from advertising for enterprises.
- It may create the public opinion. More discussion can make it become news.
- It can develop the effect of propaganda. It is easy to propagandise one thing from news because we read news every day.

No:

- Commercialisation in TV programmes is more common.
- I think they are different. No one likes to watch news and commercials at the same time. It makes me feel bad.

10. <u>Yes/ No</u>

Do you think it is effective to develop your critical thinking via PBL in relation to news media and propaganda? Why?

(Responses presented in Table 6.1 of Chapter 6)

Appendix H: Structured Observation Schedule

Criteria adapted from Buckingham (2003, pp. 54-60), Kipping (2000), and Moon (2008)

Students demonstrating critical thinking capabilities	**Check when observed**
question ideas and assumptions	
recognise and consider multiple perspectives	
examine assumptions or context of an issue for analysis	
mention limitations of current thinking	
select evidence appropriately	
Students demonstrating critical thinking in key concepts of media literacy are able to recognize or analyse	**Check when observed**
the difference of technologies used to produce and distribute media texts	
who owns the companies, makes media texts, and how they work	
the regulations of media and how effective they are	
how media texts reach their audiences	
why some voices are heard or excluded	
how media use different forms of language to convey ideas or meanings	
how these uses of language become familiar and generally accepted	
how the grammatical 'rules' or codes of media established	
the effects of choosing certain forms of language	
how meaning is conveyed through the combination or sequencing of images, sounds or words	
how technologies affect the meanings that can be created	
how media claim to tell the truth about the world	
what is included and excluded from the media world	
whether media texts support particular views about the world	
how media represent particular social groups	
why audiences accept some media representations as true, or reject others as false	
whether media representations affect our views of particular social groups or issues	
how media are aimed at particular audiences	
how the media speak to audiences	
how audiences use media in their daily lives	
how audiences interpret media	
pleasures audiences gain from the media	
the role of gender, social class, age and ethnic background in audience behavior	

Appendix I: Midterm and Final Coding Frames with Students' Responses

I.1. Midterm Coding Frame

- Impression (1)
    - Positive (1.1)
        - Implementation (1.1.1)
            - ❖ Stimulus for learning (1.1.1.1)—

(This applies if students thought that the course could stimulate their willingness or curiosity to learn more to enhance their criticality and consequently be helpful for their future.)

1. After taking this course, I found my teacher used the Western style to integrate critical thinking into our course, which is different from the spoon-feeding way used in Asia. I gradually became interested in this style. After graduation, I hope to continue studying because I am more interested in their educational style. (1.1)

2. I think sometimes newspapers are biased, and I hope I can know more about critical thinking because it can help inspire my thinking. (1.2)

3. I want to learn how to write a neutral news article without bias, not like some articles now with political interest. To learn writing objective articles, not to confuse readers' thinking. I like to know more about critical thinking and related ideas. (1.3)

4. I like to learn something about news, some skills about analysing news, and to understand what the news wants to tell us in this course. (1.4)

5. I am tired of absorbing the news editors gave us. I want to know how to dig the news truth through learning here. (1.5)

6. I think perhaps this field is so competitive that some phenomena are distorted. I would like to know why they choose to present news in those ways or how they influence others. (2.1)

7. Some news reports are not objective; sometimes I am so emotional and want to destroy the TV because they report in an unbelievable way. I hoped to learn logic and analytical concepts and news ethics from this course. (2.2)

8. I did not expect different news media might have different views. After taking this course, I started to think about their

different positions and perspectives. I hope to learn more about professional knowledge about news like editing and how they think. (2.4)

9. Because of the course, I like to read and watch more news. I read articles and watched news about why Titanic sank on the Internet. I am very interested in and curious about this kind of investigative news. (2.10)

10. From this course, I learned to understand deeper things in news, not just what was reported to us. (4.1)

11. I thought I would learn how to edit news only but did not expect this course is about viewing news from different perspectives. I have never taken this kind of curriculum before. I think it is helpful. (5.2)

12. I chose this course because I wanted to learn how to analyse, how to read the news. The teacher said advertisement is everywhere, and then I found ad is indeed ubiquitous. Thus, I want to know more about the course. (6.3)

13. I chose this course because I think the English news class is challenging. It's different from the English we often read; there are special usages. I hope I can have a job related to English after graduation. If I can learn more practical English and different things in this class, it should be helpful for my job. (7.1)

❖ Positive interaction in teamwork (1.1.1.2)—

(This applies if students talked about the benefits of working with group members to develop critical thinking.)

1. We could discuss according to different ideas, which was better than thinking alone. (2. 14)

2. Working in a group helps in developing critical thinking because we could exchange views. (6.7)

❖ Improvement in knowing (1.1.1.3)—

(This applies if students reflected on their improvement in abilities, including considering different perspectives, analysis, argumentation, deeper understanding, making judgements, or problem-solving.)

1. I can use different perspectives to view news articles, from different sides. Reading news makes me know a particular perspective or critical view from a reporter. Reporters may add their views to the news, but some news is not only about describing the reality. (3.1)

2. Before coming to this class, I couldn't analyse news. Now I can analyse news and realise what the news is talking about by analysing it. (3.2)

3. I used to read news without thinking too much, but after this class, I knew there are different views which may be added to news reporting. (3.3)

4. I am not so easily persuaded by news any more, and then I try to read more. (3.5)

5. I demonstrated critical thinking because I am more objective when reading and watching news. (3.6)

6. I think PBL is helpful for my critical thinking because we can consider the back hidden stories. (4.5)

7. I am curious about how the news is formed. I think I learned something about this. (5.1)

8. My critical thinking improves because we noted both the good and bad parts of both sides. (5.8)

9. This time in the midterm, I think it is easier to present different views from two sides after making the previous presentations. (5.10)

10. After taking this course, I know how to analyse and have more thinking. (6.2)

11. We thought our project was complete, but the teacher said it was not enough, so we went back to check the reminder you sent us. The weaknesses the teacher pointed out were that we did not identify a real problem and find out a concrete way to solve the problem, so we especially noticed this part when we did our midterm project. (6.5)

12. My critical thinking improves in the part of contrasting the differences. (6.6)

13. I learned to analyse different newspapers; I think I learned a lot. (7.2)

- Method (1.1.2)

  - Interest in the topics provided (1.1.2.1)—

    1. The topic technology interests me the most. If you don't use it, you will never know what will happen or its function. So I think it's quite interesting. (1.8)

    2. I think our topic is close to our life, very controversial. We can often read or watch these kinds of issues. We can see the contrast of the differences between *Liberty Times* and

United Daily, their views, issues. Viewers can be influenced by those newspapers. It is obvious that the positions of the two newspapers are different, and their views of President Ma and importing American beef were also different. I think it is a good topic we can learn. (6.1)

❖ Various resources (1.1.2.2)—

1. After the teacher's introduction of different international news websites, I realised it is so interesting that there are so many articles I can read, in addition to *China Post* and *Taipei Times* that I usually refer to. I think that is one of the reasons I like this course. (2.8)

2. In this class, we read various news articles from Taiwan and other countries. Compared with our Taiwanese media, sometimes I think the news from international media is more objective though they may also say something positive for their own countries. I think reading news from international media can make me think but watching news from Taiwanese media makes me feel limited to an area, unable to jump out. That is the advantage of watching or reading news from international media. (2.9)

▪ Practicability and usefulness (1.1.3)—

(This applies if students mentioned what was learned in this class was practical or useful to their real life.)

1. I think the cool thing about this course was that you know we could see things from different angles and understand that different people have various thoughts, views and perspectives. It is quite useful to our life. (2.5)

o Critical (1.2)

▪ Time limitation (1.2.1)—

1. Some information in the news course was complicated. It made me confused. And time was not enough for me to read all of the information. (1.6)

▪ The teacher's evaluation (1.2.2)—

(This applies if students talked about their uncertainty although they received the evaluation feedback.)

1. We did not know what the teacher wanted. I knew what the teacher said in the evaluation, but it was another difficult task next time. (4.3)

2. I am not sure if my critical thinking improves. Even though I got the feedback from the teacher, I still wonder if am really better than before. (4.7)

- Neutral (1.3)—

1. Although PBL should be helpful, maybe we did not really use it well because we are English majors who are used to using the general writing skills we learned in English class instead of the professional journalistic knowledge to write English news articles. (2. 11)

- Key features (2)
  - Problem-raising (2.1)—

1. When we raise a problem, I think that is an opinion to develop critical thinking. (1.9)

2. I applied PBL by thinking about the problem first. (5.6)

3. According to the journalistic questions of the articles, we would think about deeper questions. We sometimes referred to other perspectives from particular articles, and sometimes the articles inspired us to think about some questions raised. Some were helpful for generating PBL problems. (5.7)

  - Problem-solving (2.2)—

1. I think the ultimate objective of news course was not to criticise others but to find out the best way to solve problems. (2.6)

  - Analysis (2.3)—

1. In PBL, we used comparison, but at first, we used a wrong way without analysis. But then we knew how to do, how to compare two different ideas. When reading in detail, I found that reporters use their own subjectivity to emphasise. (3.4)

2. We analysed the differences between two media in PBL. (4. 4)

  - Discussion (2.4)—

1. PBL needs our discussion with the teacher. I think our teacher could help us in constant discussion in the PBL process. (1.10)

2. PBL promoted our idea discussion. We tried to find out an issue worth discussing from two media and then discussed the issue and thought if it was possible to improve. Sometimes the content of different news media made no clear difference. We had to think what exactly they wanted to say. (7.3)

- Difficulties (3)
    - Complication (3.1)—

(This applies if students mentioned that the process of studying was difficult because of complicated information.)

1. At first the difficult part was that the teacher gave us the general direction because we were beginners. But when we went into the details, there were some problems about editing and interpreting especially when we translated Chinese into English. Because some international media use complicated English in the way that we don't really comprehend, we have to translate the words properly without losing the direction. They are what we need to learn. (2.7)

2. The teacher wanted to give us something, but for us beginners, we had to receive the complicated materials and then thought about how. The process was difficult. (2.13)

    - Uncertainty (3.2)
        - ❖ Definition (3.2.1)—

1. Is critical thinking about people's individual thinking or we have to analyse the news to find? I am a little confused. (1.7)

2. Is critical thinking about emotional criticising? Can it be based on personal opinions? I am confused about the meaning. (1.11)

        - ❖ Direction (3.2.2)—

(This applies if students mentioned that they were confused about what topic they should choose, how to start, or whether they adopted the method appropriately.)

1. We are still confused about where we should go, what the focus should be. For example, when we did our report, we just presented superficial things. We did not know where we should start to search information. (1.12)

2. I don't expect it to be so hard. And I don't know how to do is right. I need to figure out the way to do the reports. (2.3)

3. PBL must be helpful for developing our critical thinking, but the problem is how deeply we adopted the method, or if we used it correctly. (2.12)

4. I think my critical thinking was demonstrated because of the teaching, but it seemed that there were more questions coming up. I always doubted "Is what I said right?" or "should I say in this or that way?" "What does this exactly mean?" (2.15)

5. I was confused about the presentation. I didn't know how to do it first. (4.2)

6. To read or watch international news is very different from what we receive from the media in Taiwan. Our media have clear stances towards blue (KMT) or green (DPP). We can recognise which TV supports which political party, but when we refer to international news, we don't feel the difference. Their positions are not so clear for us, so we don't know how to find out the difference. (4.6)

7. When we analysed an article, we didn't know where to start, what we should analyse, from their ideas or viewpoints. A bit chaotic, don't know where to start. (5.3)

8. I think the information provided by the teacher was enough, but we did not know how to find out the controversy. (5.4)

9. When I wrote, I was afraid my subjective opinion was added. Not sure and afraid what I wrote was too subjective. (5.5)

10. I wondered if the topic chosen in our presentation was more controversial time after time. (5.9)

11. It was hard to choose topics. After deciding a topic, we searched for more information but found it was too difficult to analyse because there were too many professional terms. So we kept on changing topics. (6.4)

I.2. Final Coding Frame

- Impression (1)
    - Positive (1.1)
        - Implementation (1.1.1)
            - ❖ Stimulus for learning (1.1.1.1)—

(This applies if students thought that the course could stimulate their willingness or curiosity to learn more to enhance their criticality and consequently be helpful for their future.)

1. I think the course is still attractive to me because I can use critical thinking to analyse the news values. (1.1)
2. Because of this course, I read a lot of foreign news. I like foreign news very much. I am a Taiwanese, so reading Chinese characters is not difficult for me. But reading or watching foreign news to analyse is difficult. It was very challenging, and I was very excited. (2.13)

❖ Positive interaction in teamwork (1.1.1.2)—

(This applies if students talked about the benefits of working with group members to develop critical thinking.)

1. I think the best was to learn through teamwork, and the best was that we could come up with conclusions. (1.4)

2. Working in a group helped to develop our critical thinking because we could exchange our different ideas. Every week, Monday after class, our group members would talk about our next topic that we needed to report in the class. Every person started to express their opinions, and in that discussion, we fought because my personal opinion could not be accepted by other group mates. It was not absolute, so we continued to discuss if our opinion could be covered in the topic next time. So we discussed and spent much time on the Internet or after the class. (2.8)

3. When we found the problem, we would discuss and find out the correct answer based on our thought. It helped to develop our critical thinking. (3.7)

4. Teamwork is helpful because everyone has different thinking. We have to take different opinions into consideration. If your opinions are different from others, you have to think about what others think, use other ways to think. (4.6)

5. Just like this time we chose the topic about Korean fashion. We had different viewpoints. Sometimes we divided

ourselves into two groups to argue for different sides about this issue. We think it's helpful. (5.9)

6. Teamwork can help brainstorm a lot. We communicated with each other and chose our best topic. And it's very good. (6.5)

7. We didn't argue but discussed the problem in a team. We just discussed and we all agreed. And I think the news it's easy to come up with an idea about which topic to choose. For example, if he thinks it's the best, others will agree with him. (7.7)

❖ Improvement in knowing (1.1.1.3)—

(This applies if students reflected on their improvement in abilities, including considering different perspectives, analysis, argumentation, deeper understanding, making judgements, or problem-solving.)

1. I learned that we can't completely trust media. We must have our own ideas because sometimes media have bias. So it's good for us to use critical thinking to analyse the news. (1.10)

2. When I reported with our group mates, it's a very great opportunity to learn how to speak louder, to speak clearly. And when I spoke about my report, I always noticed my grammar, making sure if I could make my classmates and teacher understand what I was arguing about. So I think doing many reports for me is a very great experience. (2.3)

3. We were unable to find out problems before the midterm, but after that, in the final, we were able to talk about the problem of our topic, like globalisation. US enterprises can propagandise their products to the rest of the world, but they also have the problem to disseminate their products to the inside Africa because generally speaking, inside Africa has no technology to connect to the other parts of our world, including the developed countries. So they have developed their ways to disseminate to the inside Africa, I think it's really amazing. (2.7)

4. Because of the teacher's instruction, we improved in finding information to argue for our ideas. (2.11)

5. It trained me to speak fluently, and words we used, not so easy as we used before. We chose more difficult words to establish our thinking. (2.14)

6. Before we learned in this class, we did not know how to analyse the news, such as using critical thinking to analyse newspapers in different points. After finishing this course, my critical thinking ability improved. I think it is easier to understand the surface of the article, but it is hard to understand the influence of the media on the public. (3.2)

7. We learned from the mistakes in the first cycle, and we did PBL project better and more critically by analysing this time. (3.6)

8. When I read newspapers, I will have different thinking about this reporter. (3.10)

9. I improved in comparing one view with those in other newspapers for the same issue. (3.11)

10. I can write a lot more and create based on my own thinking now. (3.12)

11. I will analyse and compare and have my own opinion. When my friend tells me the news, I wouldn't just believe it. I would compare it with other views and find more information. (3.13)

12. Compared with the midterm, our final project was much deeper because we thought deeper. Our midterm was superficial. I think we made a lot of progress. (4.1)

13. We can understand the inside part of news. At the beginning, we didn't know what to do, but after doing, we could find out the point the teacher wanted more easily. (4.2)

14. My best experience was that I didn't think very much about the media, but after the course, I recognised my thinking in my mind. Before this, we just watched the media without thinking too much. (4.3)

15. Before the midterm, we just criticised the news from our point of view, but after getting the bad results of our writing, we would write from different sides. We just wrote what we thought in our individual writing before without thinking about the media before. (4.9)

16. We did think about the parts that we didn't consider before. This course made us think. In the past, I just read and never thought so much, especially about politics. (5.5)

17. Just like the subject we did this time, globalisation is a trend, but we would think about the positive and negative consequences, every aspect. For example, the food in McDonald's is delicious, so everybody just eats it. To collect the points to win a free gift, we have to eat the food every day. I won't do that. (5. 8)

18. We now are able to make judgements calmly and rationally. (5.11)

19. We have more ideas, our own thinking, and we question the assumptions of news media. (6.7)

20. It is more useful to know how to use PBL to analyse the articles we read because before we took the course, we didn't think too much about the news or hard articles. After taking the course, we could realise the context of the articles and think about what we should learn after we read the articles. (7.1)

21. I can watch the news deeply to find out the real hidden problem. (7.5)

22. Because before the midterm, we did not know what to do in PBL, how to take the first step. But after doing the research, we were clearer to know which step we should take the first and which was the most important to solve a problem. (7.6)

- Method (1.1.2)

  - Interest in the topics provided (1.1.2.1)—

    1. I am interested in the topic of cultural imperialism. In many ways, I think it's hard to avoid this kind of trend because the so-called globalisation is happening, or has been happening. There's no one left alone without any contacting with other people or countries. So I think it's not easy to say that we will live without this trend. (1.6)

    2. I think PBL in the second cycle was more helpful because the topics in this cycle were closer to our real life. (1.7)

    3. My favorite topic is cultural imperialism. Cultural imperialism is a real problem, a global problem that we did not notice before. Like McDonald's, Starbucks, why have they been so successful since the past? We can learn this by searching imperialism. (2.5)

    4. Our university is famous for dress, clothing design. At that time, we talked about gender stereotype, we quickly thought about the two famous designers, Yio-Wen Gu and Jason Wu. We were very happy to do this report and very excited. I think we can use the chance to understand our department. I think that's the reason why we like to do the topic— gender stereotype. (2.6)

    5. We are interested in the theme, views of the world, and we chose globalisation as our topic. It affects our life a lot. (3.5)

    6. My favorite topic is stereotyping. I found out an interesting speech about homosexual; after we listened to it, we changed our thinking, not so biased anymore. (4.5)

    7. I am interested in globalisation. The topic is easier. It's closer to our life. It's easier to do, easier to search the information. (5.6)

8. The topics this time are sometimes linked with our life. We can give the questions about the topic and to find out the answers to them. (5.7)

9. Some of the topics were interesting, for example, Lady Gaga. I searched a lot of information about her, and I read a lot of news about her because I like her. We related her case to the topic of cultural imperialism. (6.2)

❖ Various activities (1.1.2.2)—

1. It was funny to host a talk show because we could express our opinions in a more lively way, not just report in presentations. (3.3)

2. We had many chances of making different presentations, and I think it is useful for our jobs in the future. (3.14)

▪ Practicability and usefulness (1.1.3)—

(This applies if students mentioned what was learned in this class is practical or useful to their real life.)

1. I did not think critical thinking would be applied to our life, but after doing our projects about Apple Company, I realised that the issue happens to our life and relates to our daily life. (4.4)

2. It's helpful to my real life. When watching news, I will think about more perspectives. (4.10)

3. Critical thinking is helpful in my real life. Take McDonald's as an example, I won't be easily persuaded by the advertisement. (5.12)

4. The topic in the second cycle related to critical thinking is influential in my mind and life. (6.4)

5. The knowledge of good information can affect our life positively, and we can have more self-ideas about news events. (6.8)

6. The course was very difficult, but I can develop my critical thinking for my future. And I have learned a lot by finding out the solution. (7.2)

7. I think it's interesting because I was seldom active to read the news. But after the course, I can read more and evaluate. It should be practical to my life. (7.3)

8. After learning, maybe we will use critical thinking to analyse the news content in our real life. (7.10)

- Critical (1.2)
    - Time limitation (1.2.1)—
        1. We just stayed on the surface level, hard to go to the deeper level, maybe lack of knowledge and background. And we did not have time to absorb the knowledge. (5.3)
        2. The most difficult was to find out the topic we wanted to select, and when we decided the topic, we should spend more time finding out which materials we should look for. It was the worst experience. (7.4)
    - The teacher's evaluation (1.2.2)—

(This applies if students talked about their uncertainty although they received the evaluation feedback.)

1. I still don't think we really conducted our final project by applying PBL. Reading the feedback is not enough; maybe the teacher can give us more examples. (1.8)

- Neutral (1.3)

1. They did not fail to meet my expectations though I thought the course was simple. In the beginning, I thought we just focused on some operational principles of media, but actually, it was deeper. It is necessary, but it is not easy to understand critical thinking. (1.9)
2. Tired. We needed to analyse the news and found out the questions. Looking for information is tiring although I know it is useful. (6.1)

- Key features (2)
    - Problem-solving (2.1)—
        1. PBL is about finding out an answer to a problem. (3.9)
        2. We found out the answer through the questions by studying the questions. If you have a question about one thing, you would like to find out the answer. So we could understand the issue through our questions. (4.7)
        3. PBL is about making a question to answer it. (5.10)
        4. We need to find out the answer from a problem. (6.6)
        5. It is about the problem and where the solution is to solve the problem. (7.8)
    - Discussion (2.2)—
        1. We would discuss and find the best in teamwork when we did our PBL project. (3.8)

- Difficulties (3)
    - Unfamiliarity (3.1)—

(This applies if students mentioned that the course was difficult because of some unfamiliar topics or terms.)

1. The teacher introduced politics. I think politics for me was difficult because those news vocabularies were too difficult. It is ambiguous when one vocabulary has two meanings for you to choose. Sometimes I was confused, so I think learning English from politics is the best way to know difficult English words. Students could learn from BBC or CNN or Chinese English stations to understand political news. (2.2)

2. It's so difficult to analyse the news because of some professional terms like Ractopamine. (3.1)

3. It was hard to understand the meaning of the movie— *Good Night, Good Luck*. It was very hard to write the reflection because it is about politics that we never learned before. (5.1)

    - Disagreement in teamwork (3.2)—

(This applies if students mentioned that it was hard to accomplish the task because of the difficulty of reaching consensus.)

1. Our group discussed the issue. We learned something from discussing the issue, but when preparing our presentations, we all had different ideas and had to discuss online, so it's hard to come up with the final decision. (1.3)

2. We met some problems. We accomplished identifying the problems for study and collected news sources. Of course we had many sources online, but we needed to choose the related or relevant sources by working separately to make it become a complete report. The process was hard because our members had so many various or different suggestions or opinions. (2.1)

3. Everyone had their working style, or their ways to connect to each other. But I think the most important was that each should be contacted by all other members, by cell phones or Internet, any ways to let others know where they were. But the most difficult part was ah…communication. One day one called another member, but she was doing her work, but the deadline was close. (2.4)

4. Actually, before we found out the real problem, we had more questions. It was hard to focus. We have six members, and every problem had six questions, so there were problems times 6. Or two might have one question, there were three problems. (2.9)

5. Everyone had different thinking styles, so we voted. But we were confused, kept on being confused. (2.10)

6. We would dig into the question, not only the surface of the question. So when we focused on one question, we would see other questions come up from

different views, not the focused question. Maybe the news report has some problems, we wonder if we should rethink or not. (2.12)

7. Sometimes teamwork was a bad experience because we had different standpoints from other people. We would fight. (3.4)

8. The hard experience was when we needed to decide our topic, we considered for a long time. Which topic is what we want? I think it's the hard time. (6.3)

- Uncertainty (3.3)—

(This applies when students were not sure about what topic to choose, how to start, or which direction to take.)

1. I think critical thinking is the hardest in this course. Because sometimes we were confused about our words to interpret the news. We always read the news, but it's hard to think of the different words, so I think critical thinking is hard. (1.2)

2. We chose Jeremy Lin— Linsanity as one of our topics to present because he' famous. I thought it was easier to collect the information but hard to relate it to critical thinking because we had no idea about how to analyse. (1.5)

3. The teacher could tell us how to start by giving us daily examples. Without the teacher's help, we might not think it is easy. (4.8)

4. I tried to use the media's perspective to write the report, but after that, the writing became our own opinions. Shouldn't we observe from the perspective of media? (5.2)

5. We chose a topic to do one of the presentations because we thought there were more news reports about that event. But we did it in the wrong way because we just introduced and described. (5.4)

6. Maybe the teacher could give us some ideas before we did the research. Give us more options about news. Otherwise, we were not sure how to carry on. (7.9)

Appendix J: Group and Individual Academic Performance

Criteria **Group vs. individual marks**	**Excellent** Group: above 80 Individual: above 90 (90-100) (A)	**Good** Group: 70-79 Individual: 80-89 (B)	**Satisfactory** Group: 60-69 Individual: 70-79 (C)	**Poor** Group: below 60 Individual: below 70 (60-69) (D)
Stages	**Contextual-postliminal**	**Independent-liminal**	**Transitional-preliminal**	**Absolute-subliminal**

Group presentation Group number/ Scores ↓	One	Two	Three	*Midterm*	Four	Talk show	Group discussion	*Final*
1	**43**	**44**	**48**	***56***	**47**	**N/A**	**N/A**	***68***
Pseudonym/ Group one individual score rank								
Peggy	D	D	D	*D*	D	D	D	*D*
Leo	D	C	C	*C*	D	C	C	*C*
Joseph	D	C	C	*C*	C	C	C	*C*
Eileen	D	D	C	*D*	D	C	C	*D*
Eva	D	D	C	*D*	D	C	D	*D*
2	**55**	**46**	**33**	***42***	**41**	**N/A**	**N/A**	***50***
Pseudonym/ Group two individual score rank								
Sam	C	C	D	*D*	C	B	C	*C*
Jane	C	C	C	*D*	C	C	C	*C*
Lily	D	D	D	*C*	D	C	C	*C*
Pearl	C	C	C	*D*	C	C	C	*D*
Linda	D	D	D	*D*	C	C	C	*C*
Teresa	C	C	C	*D*	B	B	B	*B*
3	**40**	**40**	**48**	***56***	**48**	**N/A**	**N/A**	***65***
Pseudonym/ Group three individual score rank								
Gary	C	C	C	*C*	C	B	C	*C*
Yvonne	D	D	C	*D*	C	C	D	*C*
Iris	D	D	D	*D*	C	C	D	*C*
Wendy	D	D	C	*D*	C	C	D	*D*
Winnie	D	D	C	*C*	C	C	C	*C*
4	**41**	**41**	**29**	***38***	**44**	**N/A**	**N/A**	***58***
Pseudonym/ Group four individual score rank								
Lisa	D	D	D	*C*	C	C	C	*C*
Hannah	D	D	D	*D*	D	D	C	*D*
Maureen	D	D	D	*D*	D	D	D	*D*
Jean	D	D	C	*D*	D	C	C	*D*

5	**56**	**47**	**22**	***41***	**43**	**N/A**	**N/A**	***57***
Pseudonym/ Group five individual score rank								
Becky	C	C	D	*D*	C	C	C	*D*
Justin	C	D	C	*C*	C	C	C	*C*
Willa	C	D	D	*C*	C	B	C	*C*
Jill	C	D	D	*C*	C	B	C	*C*
Wayne	C	C	D	*C*	C	C	C	*D*
6	**54**	**45**	**61**	***73***	**50**	**N/A**	**N/A**	***74***
Pseudonym/ Group six individual score rank								
Judy	C	D	D	*C*	C	D	C	*C*
Bonny	C	D	C	*C*	C	C	C	*C*
Toni	C	C	C	*B*	C	B	C	*C*
Patti	C	C	C	*B*	B	B	C	*C*
Flora	D	C	C	*B*	C	D	B	*B*
7	**44**	**44**	**45**	***55***	**39**	**N/A**	**N/A**	***66***
Pseudonym/ Group seven individual score rank								
Kenny	C	C	C	*C*	C	C	C	*C*
Jenny	C	B	B	*B*	C	D	B	*B*
Pamela	D	C	C	*B*	D	C	C	*C*
Sharon	C	C	D	*C*	D	C	B	*C*
Carol	C	D	B	*C*	D	C	C	*B*

Appendix K: Percentages and Frequencies for Closed Questions 11 to 25 in Questionnaires

I. The first dimension: students' knowledge of how news is produced

11. I understand that the news messages are constructed (pre-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree slightly	2	5.7	5.9	5.9
	no opinion	11	31.4	32.4	38.2
	agree slightly	16	45.7	47.1	85.3
	agree strongly	5	14.3	14.7	100.0
	Total	34	97.1	100.0	
Missing	9	1	2.9		
Total		35	100.0		

11. I understand how to analyse news messages after taking the course (post-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree slightly	1	2.9	3.2	3.2
	no opinion	5	14.3	16.1	19.4
	agree slightly	15	42.9	48.4	67.7
	agree strongly	10	28.6	32.3	100.0
	Total	31	88.6	100.0	
Missing	9	4	11.4		
Total		35	100.0		

12. I understand how news is gathered (pre-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree strongly	2	5.7	5.7	5.7
	disagree slightly	7	20.0	20.0	25.7
	no opinion	14	40.0	40.0	65.7
	agree slightly	10	28.6	28.6	94.3
	agree strongly	2	5.7	5.7	100.0
	Total	35	100.0	100.0	

12. I understand how to analyse the way news is gathered after taking the course (post-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree slightly	2	5.7	6.5	6.5
	no opinion	6	17.1	19.4	25.8
	agree slightly	16	45.7	51.6	77.4
	agree strongly	7	20.0	22.6	100.0
	Total	31	88.6	100.0	
Missing	9	4	11.4		
Total		35	100.0		

13. I understand how news is presented (pre-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree strongly	1	2.9	2.9	2.9
	disagree slightly	3	8.6	8.6	11.4
	no opinion	14	40.0	40.0	51.4
	agree slightly	13	37.1	37.1	88.6
	agree strongly	4	11.4	11.4	100.0
	Total	35	100.0	100.0	

13. I understand how to analyse the way news is presented after taking the course (post-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree slightly	2	5.7	6.5	6.5
	no opinion	8	22.9	25.8	32.3
	agree slightly	13	37.1	41.9	74.2
	agree strongly	8	22.9	25.8	100.0
	Total	31	88.6	100.0	
Missing	9	4	11.4		
Total		35	100.0		

II. The second dimension: students' understanding of critical thinking and media literacy

14. I heard critical thinking before (pre-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree slightly	4	11.4	11.8	11.8
	no opinion	5	14.3	14.7	26.5
	agree slightly	17	48.6	50.0	76.5
	agree strongly	8	22.9	23.5	100.0
	Total	34	97.1	100.0	
Missing	9	1	2.9		
Total		35	100.0		

14. I understand what critical thinking is after taking the PBL course (post-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree slightly	2	5.7	6.5	6.5
	no opinion	5	14.3	16.1	22.6
	agree slightly	12	34.3	38.7	61.3
	agree strongly	12	34.3	38.7	100.0
	Total	31	88.6	100.0	
Missing	9	4	11.4		
Total		35	100.0		

15. I know what critical thinking is (pre-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree strongly	2	5.7	5.9	5.9
	disagree slightly	2	5.7	5.9	11.8
	no opinion	10	28.6	29.4	41.2
	agree slightly	16	45.7	47.1	88.2
	agree strongly	4	11.4	11.8	100.0
	Total	34	97.1	100.0	
Missing	9	1	2.9		
Total		35	100.0		

15. I find it helpful to understand critical thinking via PBL (post-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree slightly	1	2.9	3.2	3.2
	no opinion	7	20.0	22.6	25.8
	agree slightly	13	37.1	41.9	67.7
	agree strongly	10	28.6	32.3	100.0
	Total	31	88.6	100.0	
Missing	9	4	11.4		
Total		35	100.0		

16. I know the importance of critical thinking in understanding the media (pre-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree slightly	2	5.7	5.9	5.9
	no opinion	11	31.4	32.4	38.2
	agree slightly	14	40.0	41.2	79.4
	agree strongly	7	20.0	20.6	100.0
	Total	34	97.1	100.0	
Missing	9	1	2.9		
Total		35	100.0		

16. I understand the importance of critical thinking in media literacy via PBL (post-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree slightly	1	2.9	3.2	3.2
	no opinion	8	22.9	25.8	29.0
	agree slightly	10	28.6	32.3	61.3
	agree strongly	12	34.3	38.7	100.0
	Total	31	88.6	100.0	
Missing	9	4	11.4		
Total		35	100.0		

17. I question ideas or assumptions in media messages (pre-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree strongly	1	2.9	2.9	2.9
	disagree slightly	1	2.9	2.9	5.7
	no opinion	12	34.3	34.3	40.0
	agree slightly	18	51.4	51.4	91.4
	agree strongly	3	8.6	8.6	100.0
	Total	35	100.0	100.0	

17. I always question ideas or assumptions in media messages (post-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree slightly	2	5.7	6.5	6.5
	no opinion	9	25.7	29.0	35.5
	agree slightly	14	40.0	45.2	80.6
	agree strongly	6	17.1	19.4	100.0
	Total	31	88.6	100.0	
Missing	9	4	11.4		
Total		35	100.0		

18. I understand what bias is in media messages (pre-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree slightly	4	11.4	11.8	11.8
	no opinion	12	34.3	35.3	47.1
	agree slightly	13	37.1	38.2	85.3
	agree strongly	5	14.3	14.7	100.0
	Total	34	97.1	100.0	
Missing	9	1	2.9		
Total		35	100.0		

18. I am able to detect bias in media messages (post-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree slightly	1	2.9	3.2	3.2
	no opinion	9	25.7	29.0	32.3
	agree slightly	15	42.9	48.4	80.6
	agree strongly	6	17.1	19.4	100.0
	Total	31	88.6	100.0	
Missing	9	4	11.4		
Total		35	100.0		

19. I analyse media context (pre-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree strongly	1	2.9	2.9	2.9
	disagree slightly	7	20.0	20.0	22.9
	no opinion	14	40.0	40.0	62.9
	agree slightly	9	25.7	25.7	88.6
	agree strongly	4	11.4	11.4	100.0
	Total	35	100.0	100.0	

19. I am able to analyse media context (post-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree slightly	2	5.7	6.5	6.5
	no oponion	8	22.9	25.8	32.3
	agree slightly	18	51.4	58.1	90.3
	agree strongly	3	8.6	9.7	100.0
	Total	31	88.6	100.0	
Missing	9	4	11.4		
Total		35	100.0		

20. I seek alternative points and sources of information when reading the media (pre-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	diagree strongly	2	5.7	5.7	5.7
	disagree slightly	1	2.9	2.9	8.6
	no opinion	15	42.9	42.9	51.4
	agree slightly	14	40.0	40.0	91.4
	agree strongly	3	8.6	8.6	100.0
	Total	35	100.0	100.0	

20. I am able to seek alternative points and sources of information when reading the media (post-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no opinion	6	17.1	19.4	19.4
	agree slightly	21	60.0	67.7	87.1
	agree strongly	4	11.4	12.9	100.0
	Total	31	88.6	100.0	
Missing	9	4	11.4		
Total		35	100.0		

21. I understand the production of media (pre-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree slightly	8	22.9	23.5	23.5
	no opinion	13	37.1	38.2	61.8
	agree slightly	11	31.4	32.4	94.1
	agree strongly	2	5.7	5.9	100.0
	Total	34	97.1	100.0	
Missing	9	1	2.9		
Total		35	100.0		

21. This course helps me to understand the production of media (post-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree slightly	1	2.9	3.3	3.3
	no opinion	2	5.7	6.7	10.0
	agree slightly	18	51.4	60.0	70.0
	agree strongly	9	25.7	30.0	100.0
	Total	30	85.7	100.0	
Missing	9	5	14.3		
Total		35	100.0		

22. I understand how meaning is conveyed through the media (pre-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree slightly	3	8.6	8.8	8.8
	no opinion	14	40.0	41.2	50.0
	agree slightly	14	40.0	41.2	91.2
	agree strongly	3	8.6	8.8	100.0
	Total	34	97.1	100.0	
Missing	9	1	2.9		
Total		35	100.0		

22. This course helps me to understand how meaning is conveyed through the media (post-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no opinion	4	11.4	12.9	12.9
	agree slightly	22	62.9	71.0	83.9
	agree strongly	5	14.3	16.1	100.0
	Total	31	88.6	100.0	
Missing	9	4	11.4		
Total		35	100.0		

23. I understand how media represent particular groups (pre-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree slightly	4	11.4	11.8	11.8
	no opinion	12	34.3	35.3	47.1
	agree slightly	14	40.0	41.2	88.2
	agree strongly	4	11.4	11.8	100.0
	Total	34	97.1	100.0	
Missing	9	1	2.9		
Total		35	100.0		

23. This course helps me to understand how media represent particular groups (post-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no opinion	5	14.3	16.1	16.1
	agree slightly	13	37.1	41.9	58.1
	agree strongly	13	37.1	41.9	100.0
	Total	31	88.6	100.0	
Missing	9	4	11.4		
Total		35	100.0		

24. I understand how the media speak to audiences (pre-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree strongly	1	2.9	2.9	2.9
	no opinion	9	25.7	25.7	28.6
	agree slightly	23	65.7	65.7	94.3
	agree strongly	2	5.7	5.7	100.0
	Total	35	100.0	100.0	

24. This course helps me to understand how media speak to audiences (post-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no opinion	4	11.4	12.9	12.9
	agree slightly	13	37.1	41.9	54.8
	agree strongly	14	40.0	45.2	100.0
	Total	31	88.6	100.0	
Missing	9	4	11.4		
Total		35	100.0		

25. I believe understanding how media production, languages, representations, and audiences interact is related to critical thinking (pre-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree strongly	1	2.9	2.9	2.9
	disagree slightly	2	5.7	5.9	8.8
	no opinion	7	20.0	20.6	29.4
	agree slightly	21	60.0	61.8	91.2
	agree strongly	3	8.6	8.8	100.0
	Total	34	97.1	100.0	
Missing	9	1	2.9		
Total		35	100.0		

25. The PBL curriculum is effective in developing my critical thinking in media literacy (post-class)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no opinion	9	25.7	29.0	29.0
	agree slightly	12	34.3	38.7	67.7
	agree strongly	10	28.6	32.3	100.0
	Total	31	88.6	100.0	
Missing	9	4	11.4		
Total		35	100.0		

Appendix L: The Outcome of Observations

L.1. The Outcome of Less Structured Observations

Scale of points: 1 to 5; from the lowest 1 to the highest 5						
Time	**Questioning assumptions**	**Detecting bias**	**Analysing context**	**Seeking alternative points and sources of information**	**Production, languages, representations, audiences, and overall performance in media literacy**	**Highlighting points**
Group one						
1	1	2	2	3	3, 2, 2, 3, 3	Focusing more on language than on other concepts
2	2	2	2	3	3, 3, 2, 2, 2	
3	3	3	2	4	3, 3, 2, 2, 2	
Group two						
1	3	3	3	4	3, 2, 3, 3, 2	Regressing in the third time because of lack of well-organised structure
2	3	2	2	3	2, 2, 2, 2, 2	
3	1	1	1	3	1, 2, 1, 2, 1	
Group three						
	2	2	2	3	2, 3, 2, 2, 2	Improving in the third time because of comparing opposing ideas more deeply
2	2	2	2	3	2, 3, 2, 2, 2	
3	3	3	3	3	4, 4, 3, 2, 3	
Group four						
1	1	2	2	2	3, 3, 2, 2, 2	Describing rather than analysing, especially in the third time
2	2	2	2	2	2, 2, 3, 2, 2	
3	1	1	2	2	1, 2, 1, 1, 1	
Group five						
1	4	3	2	3	4, 3, 3, 3, 3	Regressing in the third time because of focusing on describing
2	3	2	2	3	2, 3, 3, 2, 2	
3	1	1	1	2	2, 2, 1, 1, 2	
Group six						
1	3	3	3	3	3, 3, 3, 3, 3	Revising the parts ignored last time and presenting ideas with wider consideration
2	1	2	2	3	2, 2, 2, 1, 2	
3	4	3	3	3	4, 4, 3, 4, 4,	
Group seven						
1	2	2	2	3	3, 3, 2, 2, 3	Stressing the structure of articles instead of tackling the problem
2	2	2	2	3	3, 3, 2, 2, 2	
3	2	2	2	3	2, 3, 3, 2, 2	

L.2. The Outcome of Structured Observations

_____ out of 3 times

Students demonstrating critical thinking capabilities	**Group**						
	1	**2**	**3**	**4**	**5**	**6**	**7**
question ideas and assumptions	3	3	3	3	3	3	3
recognise and consider multiple perspectives	3	1	3	3	3	3	1
examine assumptions or context of an issue for analysis	3	1	2	2	3	3	3
mention limitations of current thinking	0	0	0	0	0	0	0
select evidence appropriately	3	3	2	3	3	3	0
Students demonstrating critical thinking in key concepts of media literacy are able to recognize or analyse	**Check when observed**						
the difference of technologies used to produce and distribute media texts	0	1	1	0	1	0	0
who owns the companies, makes media texts, and how they work	0	0	0	1	0	0	0
the regulations of media and how effective they are	0	0	0	0	0	0	0
how media texts reach their audiences	1	1	0	1	2	3	1
why some voices are heard or excluded	3	3	2	3	3	2	2
how media use different forms of language to convey ideas or meanings	3	0	1	0	1	1	0
how these uses of language become familiar and generally accepted	3	3	3	1	3	2	2
how the grammatical 'rules' or codes of media established	0	0	1	0	1	1	1
the effects of choosing certain forms of language	3	1	3	2	2	3	2
how meaning is conveyed through the combination or sequencing of images, sounds or words	0	0	1	0	0	0	0
how technologies affect the meanings that can be created	0	1	0	0	0	0	0
how media claim to tell the truth about the world	2	0	1	1	3	3	2
what is included and excluded from the media world	3	3	2	2	3	3	2
whether media texts support particular views about the world	2	2	3	2	3	3	1
how media represent particular social groups	2	1	1	2	2	2	2
why audiences accept some media representations as true, or reject others as false	0	0	0	0	0	0	1
whether media representations affect our views of particular social groups or issues	2	0	1	1	1	0	1
how media are aimed at particular audiences	0	1	1	0	1	0	2
how the media speak to audiences	1	1	1	1	1	0	2
how audiences use media in their daily lives	0	1	1	0	1	0	2
how audiences interpret media	0	0	0	0	0	1	1
pleasures audiences gain from the media	0	0	1	0	1	1	0
the role of gender, social class, age and ethnic background in audience behavior	2	2	1	2	2	2	2

Appendix M: Frequencies for Closed Questions 1 to 10 in Questionnaires

Agree strongly	Agree slightly	No opinion	Disagree slightly	Disagree strongly
1). I like to read or watch news. (pre-class) (n = 35)				
12	16	6	1	0
1). I am more interested in reading and watching news because of taking the course. (post-class) (n = 31)				
7	18	6	0	0
2). I read or watch news every day. (pre-class) (n = 35)				
8	13	9	4	1
2). I read or watch news more often than I did before taking the course. (post-class) (n =31)				
11	12	6	2	0
3). I like to read newspapers better than watch television news. (pre-class) (n =35)				
1	4	19	9	2
3). I understand the difference of contents between electronic and print media more than I did before taking the course. (post-class) (n = 31)				
4	18	8	1	0
4). I like to watch television news better than read news online. (pre-class) (n = 35)				
10	14	6	3	2
4). I understand print media have developed online versions to face the crisis of being challenged. (post-class) (n = 31)				
6	19	5	1	0
5). The most accessible way of knowing current events is to read news on the Internet. (pre-class) (n = 35)				
11	15	8	0	1
5). I enjoy the convenience of reading online news and also consider the impact of technology on our life. (post-class) (n = 31)				
16	13	2	0	0
6). I read news from electronic media more than from print media. (pre-class) (n = 35)				
16	12	4	2	1
6). I read print news as well as electronic news. (post-class) (n = 30)				
3	10	9	7	1
7). I read or watch news because I know it is important to know what is happening in the world. (pre-class) (n = 35)				
21	9	5	0	0
7). I read or watch news because I understand keeping up with the world is essential to my life. (post-class) (n = 31)				
11	14	5	1	0
8). I read or watch news because I want to know what is happening to celebrities. (pre-class) (n = 35)				
11	14	8	1	1
8). I also understand the function of entertaining is important to the media. (post-class) (n = 31)				
11	12	8	0	0
9). I prefer local news. (pre-class) (n = 35)				
1	14	13	4	3
9). I find it useful to learn news media and propaganda via PBL in the media literacy class. (post-class) (n = 31)				
7	13	11	0	0
10). I prefer international news. (pre-class) (n = 35)				
10	14	10	1	0
10). I find it useful to learn news media and views of the world via PBL in the media literacy class. (post-class) (n = 30)				
9	14	7	0	0

Bibliography

Alvermann, D. E., & Hagood, M. C. (2000). Critical media literacy: Research, theory, and practice in "new times". *The Journal of Educational Research, 93*(3), 193-205. URL: http://www.jstor.org/stable/27542264

Anderson II, J. C. (2007). *Effect of problem-based learning on knowledge acquisition, knowledge retention, and critical thinking ability of agriculture students in urban schools.* (PhD thesis). University of Missouri-Columbia. Retrieved from: https://mospace.umsystem.edu/xmlui/bitstream/handle/10355/4832/research.pdf?sequence=3

André, D., & Fernand, G. (2008). Sherlock Holmes- An expert's view of expertise. *British Journal of Psychology, 99*, 109-125. doi: 10.1348/000712607X224469

Arke, E. T., & Primack, B. A. (2009). Quantifying media literacy: Development, reliability, and validity of a new measure. *EMI Educ Media Int., 46*(1), 53-65. doi: 10.1080/09523980902780958

Association for Media Literacy. (2015). *What is media literacy?* Retrieved from: http://www.aml.ca/keyconceptsofmedialiteracy/

Aufderheide, P., & Firestone, C. (1993). *Media Literacy: A Report of the National Leadership Conference on Media Literacy.* Washington, D.C.: Aspen Institute. Retrieved from: http://files.eric.ed.gov/fulltext/ED365294.pdf

Avison, D., Lau, F., Myers, M., & Nielsen, P. A. (1999). Action research. *Communications of the ACM, 42*(1), 94-97. doi: 10.1145/291469.291479. Retrieved from: http://cacm.acm.org/magazines/1999/1/7996-action-research/fulltext

Bailin, S. (1996). Critical thinking. In J. J. Chambliss (Ed.), *Encyclopedia of philosophy of education* (pp. 119-123). N. Y.: Garland.

Baillie, C., Bowden, J. A., & Meyer, J. H. F. (2013). Threshold capabilities: Threshold concepts and knowledge capability linked through variation theory. *Higher Education, 65*(2), 227-246. doi: 10.1007/s10734-012-9540-5

Barber, J. P., King, P. M., & Baxter Magolda, M. B. (2013). Long strides on the journey toward self-authorship: Substantial developmental shifts in college students' meaning making. *The Journal of Higher Education, 84*(6), 866-896. doi: 10.1353/jhe.2013.0033

Barnett, R. (1997). *Higher education: A critical business.* Buckingham: Society for Research into Higher Education & the Open University Press.

Barnett, R., & Coate, K. (2011). *Engaging the curriculum in higher education.* Maidenhead: SRHE and Open University Press.

Barrett, T. (2005). Understanding problem-based learning. In T. Barrett, I. M. Labhrainn, & H. Fallon (Eds.), *Handbook of enquiry & problem-based learning* (pp. 13-25). Galway: CELT. Retrieved from: http://www.nuigalway.ie/celt/pblbook/

Barrett, T. (2010). The problem-based learning process as finding and being in flow. *Innovations in Education and Teaching International, 47*(2), 165-174. doi: 10.1080/14703291003718901

Barrett, T., Cashman, D., & Moore, S. (2012). Designing problems and triggers in different media. In T. Barrett, & S. Moore (Eds.), *Problem-based learning: Revitalizing your practice in higher education* (pp. 18-35). Oxon, New York: Routledge.

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

Barrows, H. S. (1992). *The tutorial process.* Springfield: Southern Illinois University.

Barrows, H. S. (1996). Problem-based learning in medicine and beyond: A brief overview. In L. Wilkerson & W. H. Gijselaers (Eds.), *Bringing problem-based learning to higher education: Theory and practice* (pp. 3-12). San Francisco: Jossey-Bass.

Barrows, H. S., & Tamblyn, R. M. (1980). *Problem-based learning: An approach to medical education.* New York: Springer Publishing.

Baumfield, V., Hall, E. & Wall, K. (2008). *Action research in the classroom.* Los Angeles: Sage.

Baxter Magolda, M. B. (1992). *Knowing and reasoning in college: Gender-related patterns in students' intellectual development.* San Francisco: Jossey-Bass.

Baxter Magolda, M. B. (2004). Learning partnerships model: A framework for promoting self-authorship. In M. B. Baxter Magolda & P. M. King (Eds.), *Learning partnerships: Theory and models of practice to educate for self-authorship* (pp. 37-62). Sterling, Virginia: Stylus Publishing.

Baxter Magolda, M. B. (2009). The activity of meaning making: A holistic perspective on college student development. *Journal of College Student Development, 50*(6), 621-639. doi: 10.1353/csd.0.0106

Baxter Magolda, M. B. (2010). A tandem journey through the labyrinth. *Journal of Learning Development in Higher Education,* (2), Retrieved from: http://www.aldinhe.ac.uk/ojs/index.php?journal=jldhe&page=article&op=view&path%5B%5D=61&path%5B%5D=37

Beckton, J. (2009). Educational development units: The challenge of quality enhancement in a changing environment. In L. Bell, H. Stevenson, & M. Neary (Eds.), *The future of higher education: Policy, pedagogy, and the student experience* (pp. 57-68). London: Continuum International Publishing.

Bedford, T., & Burgess, J. (2001). The focus group experience. In M. Limb & C. Dwyer (Eds.), *Qualitative methodologies for geographers: Issues and debates* (pp. 121-135). New York: Arnold.

Berger, J. (2011). Evaluating the effectiveness of instruction using principles of adult learning. In V. C. X. Wang (Ed.), *Assessing and evaluating adult learning in career and technical education* (pp. 173-190). Hershey: IGI Global.

Bernstein, D. (1995). A negotiation model for teaching critical thinking. *Teaching of Psychology*, *22*(1), 22-24.

Bloom, B. S. (Ed.) (1956). *Taxonomy of educational objectives: The classification of educational goals. Handbook 1: cognitive domain.* New York: Longman.

Boes, L. M., Baxter Magolda, M. B., & Buckley, J. A. (2010). Foundational assumptions and constructive-developmental theory: Self-authorship narratives. In M. B. Baxtor Magolda, P. S. Meszaros, & E. G. Creamer (Eds.), *Development and assessment of self-authorship: Exploring the concepts across cultures* (pp. 3-23). Sterling, VA, USA: Stylus Publishing.

Boud, D., & Feletti, G. (1997). Changing problem-based learning: Introduction to the second edition. In D. Boud, & G. Feletti (Eds.), *The challenge of problem-based learning (2nd ed.)* (pp. 1-14). London: Kogan Page Limited.

Bowden, J. A. (2004). Capabilities-driven curriculum design. In C. Baillie & I. Moore (Eds.), *Effective teaching and learning in engineering* (pp. 36-47). London: Kogan Page.

Brooks, J. G., & Brooks, M. G. (1999). *In search of understanding: The case for constructivist classrooms.* Alexandria, VA: ASCD.

Brooks, R., Fuller, A., & Waters, J. (2012). Changing spaces of education: An introduction. In R. Brooks, A. Fuller, & J. Waters (Eds.), *Changing spaces of education: New perspectives on the nature of learning* (pp. 1-17). London, New York: Routledge.

Bruner, J. S. (1996). *The culture of education.* Cambridge, MA: Harvard University Press.

Bryman, A. (2004). Triangulation. In M. S. Lewis-Beck, A. Bryman, & T. F. Liao (Eds.), *The Sage encyclopaedia of social science research methods* (pp. 1142-1143). Thousand Oaks, London: SAGE.

Buckingham, D. (2003). *Media education: Literacy, learning and contemporary culture.* Cambridge: Polity Press.

Buckingham, D. (2009). *The future of media literacy in the digital age: Some challenges for policy and practice.* Retrieved from: http://medienimpulse.at/articles/view/143

Buckingham, D. (2014). Guest editorial: The success and failure of media education. *Media Education Research Journal, 4*(2), 5-18. Retrieved from: http://merj.info/wp-content/uploads/2014/01/MERJ_4-2-Editorial.pdf

Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin, 56*(2), 81-105.

Cappello, G., Felini, D., & Hobbs, R. (2011). Reflections on global developments in media literacy education: Bridging theory and practice. *Journal of Media Literacy Education, 3*(2), 66-73. Retrieved from: http://digitalcommons.uri.edu/jmle/vol3/iss2/1/

Carney, K. C. (2002). Baxter Magolda's epistemological reflection model. *The Impact of College on Students. 07C: 336.* Retrieved from: http://www.docstoc.com/docs/98449599/Baxter-Magoldas-Model-ofEpistemological-Reflection

Carr, W. & Kemmis, S. (1986). *Becoming critical: Education, knowledge and action research.* London: Falmer.

Chan, Z. C. Y. (2013). Exploring creativity and critical thinking in traditional and innovative problem-based learning groups. *Journal of Clinical Nursing, 22,* 2298–2307. doi: 10.1111/jocn.12186

Cheung, C. K. (2009). Media education across four Asian societies: Issues and themes. *International Review of Education, 55*(1), 39-58. doi: 10.1007/s11159-008-9111-2

Clark, C. E. (2006). Problem-based learning: How do the outcomes compare with traditional teaching? *The British Journal of General Practice, 56*(530), 722-723. Retrieved from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1876647/

Cobb, P., Boufi, A., McClain, K. & Whitenack, J. (1997). Reflective discourse and collective reflection. *Journal for Research in Mathematics Education, 28*(3), 258-277. URL: http://www.jstor.org/stable/749781

Cohen, L., Manion, L., & Morrison, K. (2007). *Research methods in education (6th ed.).* London, New York: Routledge.

Conole, G. (2012). Learning in an open world. In R. Brooks, A. Fuller, & J. Waters (Eds.), *Changing spaces of education: New perspectives on the nature of learning* (pp. 219-243). London, New York: Routledge.

Conway, J., & Little, P. (2000). From practice to theory: Reconceptualising curriculum development for PBL. *Conference Proceedings, 2nd Asia Pacific Conference on Problem-Based Learning.* Temasek Centre for Problem-Based Learning. Retrieved from: http://www.tp.edu.sg/staticfiles/TP/files/centres/pbl/pbl_janeconwaypennylittle.pdf

Coombs, J. R., & Daniels, L. B. (1991). Philosophical inquiry: Conceptual analysis. In E. C. Short (Ed.), *Forms of Curriculum Inquiry* (pp. 27-41). Albany, N. Y.: State University of New York.

COST (European Cooperation in Science and Technology). (2013). *Media literacy research and policy in Europe: A review of recent, current and planned activities.* Retrieved from: http://www.lse.ac.uk/media@lse/documents/mpp/cost-media-literacy-research-and-policy-in-europe-final.pdf

Cottrell, S. (2005). *Critical thinking skills.* Basingstoke: Palgrave Macmillan.

Cottrell, S. (2011). *Critical thinking skills: Developing effective analysis and argument (2nd ed.).* Basingstoke, England: Palgrave MacMillan.

Coughlan, S. (2014, September). UK shifts to graduate economy, but worry over skills gap. *BBC Education News.* Retrieved from: http://www.bbc.co.uk/news/education-29086591?SThisFB

Cousin, G. (2006). An introduction to threshold concepts. *Planet, 17,* 4-5. doi: 10.11120/plan.2006.00170004

Curle, C., Wood, J., Haslam, C. & Stedman, J. (2006). Assessing learning in a PBL curriculum for healthcare training. In C. Bryan & K. Clegg (Eds.), *Innovative assessment in higher education* (pp. 180-190). Oxon: Routledge.

Dahlgren, M. A., Castensson, R. & Dahlgren, L. O. (1998). PBL from the teacher's perspective: Conceptions of the tutor's role within problem-based learning. *Higher Education, 36*(4), 437-447. URL: http://www.jstor.org/stable/3448208.

Danesi, M. (2009). *Dictionary of media and communications.* Armonk, New York, London: M.E. Sharpe.

DCMS (Department for Culture, Media and Sport, Great Britain). (2001). *Media literacy statement: A general statement of policy by the Department for Culture, Media and Sport on Media Literacy and Critical Viewing Skills.* Retrieved from: https://www.mediasmart.org.uk/docs/about/MedLitStatement2001.pdf

De Abreu, B. S. (2007). *Teaching media literacy.* New York: Neal-Schuman Publishers, Inc.

Delisle, R. (1997). *How to use problem-based learning in the classroom.* Alexandria, VA, USA: Association for Supervision and Curriculum Development.

Denscombe, M. (2010). *The good research guide: For small-scale social research projects.* Maidenhead: Open University Press.

Denzin, N. K. (1978). *The research act: A theoretical introduction to sociological methods.* New York: McGraw-Hill.

Denzin, N. K., & Lincoln, Y. S. (2011). Introduction: The discipline and practice of qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (pp. 1-20). London: Sage.

Dewey, J. (1910). *How we think.* Lexington, MA: D. C. Health.

Dewey, J. (1933). *How we think: A restatement of the relation of reflective thinking to the educative process.* Boston: D. C. Health.

Dewey, J. (2004). *Democracy and education.* Mineola, N. Y.: Dover Publications.

Downing, K., Kwong, T., Chan, S. W., Lam, T. F., & Downing, W. K. (2009). Problem-based learning and the development of metacognition. *Higher Education, 57*(5), 609-621. doi: 10.1007/sl 0734-008-9 165-x

Doyle, A. C. (1966). A Study in Scarlet. In *The complete Sherlock Holmes stories.* (pp. 2-54). London: John Murray.

Drisko, J. W. (2011). Triangulation. *Oxford bibliographies*. doi: 10.1093/OBO/9780195389678-0045

Duch, B. J. (1995). *What is problem-based learning? A Newletter of the Center for Teaching Effectiveness.* University of Delaware. Retrieved from: http://www.udel.edu/pbl/cte/jan95-what.html

Duch, B. J. (2001). Models for problem-based instruction in undergraduate courses. In B. J. Duch, S. E. Groh, & D. E. Allen. (Eds.), *The power of problem-based learning: A practical "how to" for teaching undergraduate courses in Any discipline* (pp. 39-46). Sterling, Virginia: Stylus Publishing.

Elder, L., & Paul, R. (2010). Critical thinking: Competency standards essential for the cultivation of intellectual skills, part 1. *Journal of Developmental Education, 34*(2), 38-39. URL: http://www.jstor.org/stable/42775362

Elliott, J. (1991). *Action research for educational change.* Buckingham: Open University Press.

Elliott, J., & Adelman, C. (1975). *Classroom action research. For the Ford teaching project.* Norwich: The Project.

Engel, C. E. (1997). Not a method but a way of learning. In D. Boud, & G. Feletti (Eds.), *The challenge of Problem-based learning (2nd ed.)* (pp. 17-27). London: Kogan Page Limited.

Ennis, R. H. (1985). A logical basis for measuring critical thinking skills. *Educational Leardership, 43*(2), 44-48.

Ennis, R. H. (1993). Critical thinking assessment. *Theory into Practice, 32*(3), *Teaching for Higher Order Thinking*, 179-186. URL: http://www.jostor.org/stable/1476699

Entwistle, N. (2008). Threshold concepts and transformative ways of thinking within research into higher education. In R. Land, J. H. F. Meyer & J. Smith (Eds.), *Threshold concepts within disciplines* (pp. 22-35). Rotterdam: Sense Publishers.

Ezzy, D. (2002). Coding data and interpreting text: Methods of analysis. In D. Ezzy, *Qualitative analysis: Practice and innovation* (pp. 80-110). Australia: Allen & Unwin.

Facione, P. A. (2011). *Critical thinking: What it is and why it counts.* Millbrae, CA: Measured Reasons and the California Academic Press.

Finucane, P. M., Johnson, S. M. & Prideaux, D. J. (1998). Problem-based learning: Its rationale and efficacy. *Med J Aust, 168*(9), 445-448.

Fisher, A. (2001). *Critical thinking: An introduction.* Cambridge: Cambridge University Press.

Fleming, J. (2010). "Truthiness" and trust: News media literacy strategies in the digital age. In K. Tyner (Ed.), *Media literacy: New agendas in communication* (pp. 124-146). New York, Oxon: Routledge.

Fried, J. & Associates. (2012). Believing Is seeing: American cultural norms. In J. Fried & Associates, *Transformative learning through engagement: Student affairs practice as experiential pedagogy* (pp. 43-60). Sterling: Stylus Publishing.

Gainer, J. (2010). Professional book reviews: Critical media literacy in the 2.0. *Language Arts, 88*(1), *Language Arts in a 2.0 World*, 69-73. URL: http://www.jstor.org/stable/41804231

Halpern, D. F. (2007). The nature and nurture of critical thinking. In R. J. Sternberg, H. J. Roediger III, & D. F. Halpern (Eds.), *Critical thinking in psychology* (pp. 1-14). Cambridge : Cambridge University Press.

Halx, M. D., & Reybold, L. E. (2005). A pedagogy of force: Faculty perspectives of critical thinking capacity in undergraduate students. *The Journal of General Education, 54*(4), 293-315. doi:10.1353/jge.2006.0009

Hammersley, M. (1993). On the teacher as researcher. In M. Hammersley (Ed.), *Educational research: Current issues* (pp. 211-232). London: Paul Chapman in association with the Open University.

Harper, L. M. (2009). Clues in the Street: Sherlock Holmes, Martin Hewitt, and Mean Streets. *The Journal of Popular Culture, 42*(1). *Wiley Periodicals, Inc.*, 67-89.

Hartley, J. (2009). Journalism and popular culture. In K. Wahi-Jorgensen & T. Hanitzsch (Eds.), *The handbook of journalism studies* (pp. 310-324). New York, Oxon: Routledge.

Hartman, H. J. (1998). Metacognition in teaching and learning: An introduction. *Instructional Science, 26*(1), 1-3. Retrieved from: http://link.springer.com/article/10.1023%2FA%3A1003023628307#page-1

Hendry, G. D., Frommer, M., & Walker, R. A. (1999). Constructivism and problem-based learning. *Journal of Further and Higher Education, 23*(3), 359-371. doi: 10.1080/0309877990230306

Hermann, Marie-Louise. (2010). *Die Zukunft der seelischen Gesundheit im Alter gestalten. Wirkungen der Münsteringer Zukunftskonferenz (Shaping the future of psychological well-being in old age: Effects of the Munsterling future search conference).* Retrieved from: http://opac.nebis.ch/ediss/20111009_003412412.pdf

Hillman, W. (2003). Learning how to learn: problem-based learning. *Australian Journal of Teacher Education, 28*(2), 1-10. doi: 10.14221/ajte.2003v28n2.1

Hmelo-Silver, C. E. (2004). Problem-based learning: What and how do students learn? *Educational Psychology Review, 16*(3), 235-266

Hmelo-Silver, C. E., Duncan R. G., & Chinn, C. A. (2007). Scaffolding and achievement in problem-based and inquiry learning: A response to Kirschner, Sweller, and Clark (2006). *Educational Psychologist, 42*(2), 99-107. doi: 10.1080/00461520701263368

Hoffman, B., & Ritchie, D. (1997). Using multimedia to overcome the problems with problem-based learning. *Instructional Science, 25*(2), 97-115. URL: http://www.jstor.org/stable/23371480

Hopkins, D. (2008). *Teacher's guide to classroom research.* Berkshire: Open University Press.

Hopkins, P. E. (2007). Thinking critically and creatively about focus groups. *Area, 39*(4), 528-535. URL: http://www.jstor.org/stable/40346074

Hsu, C. J. (2014). China's influence on Taiwan's media. *Asian Survey, 54*(3), 515-539.

Jenkins, H., Purushotma, R., Clinton, K., Weigel, M., & Robison, A. J. (2006). *Confronting the challenges of participatory culture: Media education for the 21th century (White Paper).* Retrieved from the MIT website: http://mitpress.mit.edu/sites/default/files/titles/free_download/9780262513623_Confronting_the_Challenges.pdf

Jick, T. D. (1979). Mixing qualitative and quantitative methods: Triangulation in action. *Administrative Science Quarterly, 24*(4), *Qualitative Methodology*, 602-611. URL: http://www.jstor.org/stable/2392366

Johnston, B., Mitchell, R., Myles, F., & Ford, P. (2011). *Developing student criticality in higher education: Undergraduate learning in the arts and social sciences.* London: Continuum.

Jolls, T. (2012). Media literacy: The foundation for anywhere, anytime learning. *UNESCO International Conference on Media and Information Literacy for Knowledge Societies.* Retrieved from: http://www.medialit.org/reading-room/unesco-international-conference-media-and-information-literacy

Kellner, D., & Share, J. (2005). Toward critical media literacy: Core concepts, debates, organizations, and policy. *Discourse: Studies in the Cultural Politics of Education, 26*(3), 369-386.

Kellner, D., & Share, J. (2007). Critical media literacy, democracy, and the reconstruction of education. In D. Macedo & S. R. Steinberg (Eds.), *Media literacy: A reader* (pp. 3-23). New York: Peter Lang.

Kember, D. (2000). Quality in learning and teaching. In D. Kember, *Action learning and action research: Improving the quality of teaching and learning* (pp. 2-18). London: Kogan Page.

Kemmis, S. (1993). Action Research. In M. Hammersley (Ed.), *Educational Research: Current Issues* (pp. 177-190). London: Paul Chapman in association with the Open University.

Kemmis, S., & McTaggart, R. (2007). Participatory action research: Communicative action and the public sphere. In N. K. Denzin & Y. S. Lincoln (Eds.), *Strategies of qualitative inquiry* (pp. 271-330). London: Sage.

King, P., & Kitchener, K. (1994). *Developing reflective judgment.* San Francisco: Jossey- Bass.

Kipping, P. (2000). Think TV: A guide to managing TV in the home. iv-vii. Nova Scotia Department of Education.

Kirschner, P. A., Sweller, J., & Clark, R. E. (2006). Why Minimal Guidance during Instruction does not work: An analysis of the failure of constructivist, discovery, problem-based, experiential, and inquiry-based teaching. *Educational Psychologist, 41*(2), 75–86. doi: 10.1207/s15326985ep4102_1

Klein, S. R. (2012). Action research: Before you dive in, read this! In S. R. Klein (Ed.), *Action research methods: plain and simple* (pp. 1-20). New York: Palgrave Macmillan.

Koshy, V. (2005). *Action research for improving practice: A practical guide.* London: SAGE Publications Inc.

Kuhn, D. (1999). A Developmental Model of Critical Thinking. *Educational Researcher, 28*(2), 16–26. URL: http://www.jstor.org/stable/1177186

Kuhn, D., & Dean, D. (2004). Metacognition: A bridge between cognitive psychology and educational practice. *Theory into Practice, 43*(4), 268-273.

Lähteenmäki, M., & Uhlin, L. (2012). Developing reflective practitioners through PBL in academic and practice environments. In T. Barrett & S. Moore (Eds.), *New approaches to problem-based learning* (pp. 144-157). New York, Oxon: Routledge.

Land, R., & Meyer, J. H. F. (2010). Threshold concept and troublesome knowledge (5): Dynamics of assessment. In J. H. F. Meyer, R. Land, & C. Baillie (Eds.), *Threshold concepts and transformational learning* (pp. 61-79). Rotterdam: Sense Publishers.

Land, R., Cousin, G., Meyer, J. H. F., & Davies, P. (2005). Threshold concepts and troublesome knowledge (3)*: Implications for course design and evaluation. In C. Rust (Ed.), *Improving student learning diversity and inclusivity* (pp. 53-64). Oxford: Oxford Centre for Staff and Learning Development.

Land, R., Meyer, J. H. F., & Baillie, C. (2010). Editors' preface. In J. H. F. Meyer, R. Land & C. Baillie (Eds.), *Threshold concepts and transformational learning* (pp. ix-xlii). Rotterdam: Sense Publishers.

Land, R., Meyer, J. H. F., & Smith, J. (2008). Editor's preface. In R. Land, J. H. F. Meyer, & J. Smith (Eds.), *Threshold concepts within disciplines* (pp. ix-xxi). Rotterdam: Sense Publishers.

Langer, J. (1997). *Tabloid television: Popular journalism and the other news.* Florence, KY, USA: Routledge.

Levin, B. B., Dean, C. D., & Pierce, J. W. (2001). Frequently asked questions about problem-based learning. In B. B. Levin (Ed.), *Energizing teacher education and professional development with problem-based learning* (pp. 121-132). Alexandria, VA, USA: Association for Supervision & Curriculum Development.

Lewin, K. (1946) Action research and minority problems. *Journal of Social Issues, 2*, 34-46.

Lin, T. B., Li, J. Y., Deng, F., & Lee, L. (2013). Understanding new media literacy: An explorative theoretical framework. *Educational Technology & Society, 16*(4), 160-170. Retrieved from: http://www.ifets.info/journals/16_4/13.pdf

Lipman, M. (2003). *Thinking in education (2nd ed.).* New York: Cambridge University Press.

Luke, A., & Freebody, P. (1997). The social practices of reading. In S. Muspratt, A. Luke, & P. Freebody (Eds.), *Constructing critical literacies: Teaching and learning textual practice* (pp. 185-226). Sydney: Allen & Unwin.

Macintyre, C. (2000). *The art of action research in the classroom.* London: David Fulton.

Margetson, D. (1997). Why is problem-based learning a challenge? In D. Boud & G. Feletti (Eds.), *The challenge of problem-based learning (2nd ed.)* (pp. 36-44). London: Kogan Page Limited.

Martin, D. S. (2005). Critical thinking for democracy and social justice. In N. M. Michelli & D. L. Keiser (Eds.), *Teacher education for democracy and social justice* (pp. 209-228). New York, London: Routledge.

Mason, M. (2008). Critical thinking and learning. In M. Mason (Ed.), *Critical thinking and learning* (pp. 1-11). Oxford: Blackwell Publishing.

Mathison, A. (1988). Why triangulate? *Educational Researcher, 17*(2), 13-17. doi: 10.3102/0013189X017002013

Maxwell, J. A. (2013). *Qualitative research design: An interactive approach (3rd ed.).* London: SAGE.

McDougall, J., & Sefton-Green, J. (2014). *Media and information education in the UK - A report for the EU / COST: Transforming audiences project.* Project Report Online: LSE. Retrieved from: http://eprints.bournemouth.ac.uk/21522/2/McDougall_Livingstone_MIL_in_UK.pdf

McGregor, D. (2007). *Developing thinking, developing learning: A guide to thinking skills in education.* GBR: Open University Press.

McPeck, J. E. (1981). *Critical thinking and education.* Oxford: Martin Roberston.

Mettetal, G. (2012). *The what, why and how of classroom action research.* Retrieved from: http://josotl.indiana.edu/article/viewFile/1589/1588

Meyer, J. H. F. & Land, R. (2003a). Threshold Concepts and Troublesome Knowledge: linkages to Ways of Thinking and Practising. In C. Rust (Ed.), *Improving student learning — Theory and practice ten years on* (pp. pp. 412-424). Oxford: OCSLD.

Meyer, J. H. F., & Land, R. (2003b). *Threshold concepts and troublesome knowledge: Linkages to ways of thinking and practising within the disciplines. ETL Project Occasional Report 4. Edinburgh.* Retrieved from: http://www.etl.tla.ed.ac.uk/docs/ETLreport4.pdf

Meyer, J. H. F., & Land, R. (2005). Threshold concepts and troublesome knowledge (2): Epistemological considerations and a conceptual framework for teaching and learning. *Higher Education, 49*(3), 373-388. doi: 10.1007/sl0734-044-6779-5

Meyer, J. H. F., Land, R., & Davis, P. (2008). Threshold concepts and troublesome knowledge (4): Issues of variation and variability. In R. Land, J. H. F. Meyer, & J. Smith (Eds.), *Threshold concepts within the disciplines* (pp. 60-74). Rotterdam: Sense Publishers.

Meyers, C. (1986). *Teaching students to think critically.* San Francisco: Jossey-Bass.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook.* Thousand Oaks: SAGE.

Mills, G. E. (2014). *Action research: A guide for the teacher researcher (5th ed.).* Essex: Pearson.

Ministry of Interior, Republic of China (Taiwan). (n.d.). *Interior national indicators: Crude birth rate by selected countries.* Retrieved from: http://www.moi.gov.tw/stat/english/interior.asp

Moon, J. (2008). *Critical thinking: An exploration of theory and practice.* Oxon, New York: Routledge.

Morgan, D. L. (2013). Planning and research design for focus groups. *Focus Groups as Qualitative Research*, 32-46. doi: 10.4135/9781412984287

Moseley, D., Baumfield, V., Elliott, J., Gregson, M., Higgins, S., Miller, J., & Newton, D. P. (2005). *Frameworks for thinking: A handbook for teaching and learning.* Cambridge: Cambridge University Press.

Moses, L. (2008). *An introduction to media literacy.* Dubuque, IA: Kendall/ Hunt.

National Communications Committee, Republic of China, Taiwan. (2014). *The brief statistics of communications.* Retrieved from: http://www.ncc.gov.tw/english/news_detail.aspx?site_content_sn=278&is_history=0&pages=0&sn_f=1295

Nielsen. (2013, June). Zero TV households. *Nielsen Media Study Monthly Magazine*. Retrieved from: http://www.magazine.org.tw/ImagesUploaded/news/13732708542330.pdf

O'Leary, Z. (2004). *The essential guide to doing research.* London: Sage.

O'Leary, Z. (2010). *The essential guide to doing your research project.* London: Sage.

Oliver, R. (2001). Exploring the development of critical thinking skills through a web-supported problem-based learning environment. In J. Stephenson (Ed.), *Teaching and learning online: Pedagogies for new technologies* (pp. 98-111). Oxon, Sterling: RoutledgeFalmer, Stylus Publishing.

Oppenheim, A. N. (1992). *Questionnaire design, interviewing, and attitude measurement.* London, New York: Continuum.

Paul, R. (1985). McPeck's mistakes. *Informal Logic, 7*(1), 35-43.

Paul, R. (1987). Dialogical Thinking: Critical Thought Essential to the Acquisition of Rational Knowledge and Passions. In J. Baron & R. J. Sternberg (Eds.), *Teaching Thinking Skills: Theory and Practice* (pp. 127-148). New York: W. H. Freeman.

Paul, R., & Elder, L. (2002). *Critical thinking: Tools for taking charge of your professional and personal life.* FT Press: Prentice Hall.

Paul, R., & Elder, L. (2006). *The miniature guide to critical thinking: Concepts and tools.* The foundation for critical thinking. Retrieved from http://www.criticalthinking.org/files/Concepts_Tools.pdf

Perkins, D. (2008). Beyond understanding. In R. Land, J. H. F. Meyer, & J. Smith (Eds.), *Threshold concepts within the disciplines* (pp. 3-19). Rotterdam: Sense Publishers.

Perry, W. A. (1985). Different worlds in the same classroom: students' evolution in their vision of knowledge and their expectations of teachers. *On Teaching and Learning, 1*, Retrieved from: http://isites.harvard.edu/fs/html/icb.topic58474/perry.html

Potter, W. J. (2014). *Media literacy (7th ed.).* London: Sage.

Punch, K. F. (1998). Collecting qualitative data. In K. F. Punch, *Introduction to social research: Quantitative and qualitative approaches* (pp. 175-193). London: SAGE.

Radeloff, C. L., & Bergman, B. J. (2009). Global perspectives: Developing media literacy skills to advance critical thinking. *Feminist Teacher, 19*(2), 168-171.

Rogoff, B. (1990). *Apprenticeship in thinking: Cognitive development in social context.* New York: Oxford University Press.

Rowbottom, D. P. (2007). Demystifying threshold concepts. *Journal of Philosophy of Education, 41*(2), 263-270. doi: 10.1111/j.1467-9752.2007.00554

Savery, J. R. (2015). Overview of problem-based learning: Definitions and distinctions. In A. Walker, H. Leary, C. E. Hmelo-Silver, & P. A. Ertmer (Eds.), *Essential readings in problem-based learning* (pp. 5-15). West Lafayette, Indiana: Purdue University Press.

Savery, J. R., & Duffy, T. M. (1995). Problem-based learning: An instructional model and its constructivist framework. *Educational Technology, 35*(5), 31-38.

Savin-Baden, M. (2006). Disjunction as a form of troublesome knowledge in problem-based learning. In J. H. F. Meyer & R. Land (Eds.), *Overcoming barriers to student understanding: Threshold concepts and troublesome knowledge* (pp. 160-172). London: Routledge.

Scheja, M., & Pettersson, K. (2010). Transformation and contextualisation: Conceptualising students' conceptual understandings of threshold concepts in Calculus. *Higher Education, 59*(2), 221-241. doi: 10.1007/sl0734-0O9-9244-7

Schön, D. A. (1995). *The reflective practitioner: How professionals think in action.* London: Arena.

Schreier, M. (2012). *Qualitative content analysis in practice.* London: Sage.

Scott, D. (2008). Jerome Bruner and psycho-cultural views of learning. In *Critical essays on major curriculum theorists* (pp. 91-102). Oxon, New York: Routledge.

Siegel, H. (1988). *Educating reason: Rationality, critical thinking, and education.* New York, London: Routledge.

Silverblatt, A. (2001). *Media literacy: Keys to interpreting media messages.* Wesport, CT: Praeger Publishers.

Silverman, D. (1993). *Interpreting qualitative data: Methods for analyzing talk, text and interaction.* London: Sage.

Smith, F. (2004). *Understanding reading: A psycholinguistic analysis of reading and learning to read (6th ed.).* Mahwah, N.J., London: L. Erlbaum Associates.

Somekh, B. (2006). *Action research: A methodology for change and development.* Maidenhead: Open University Press.

Stenhouse, L. (1975). *An introduction to curriculum research and development.* London: Heinemann Educational.

Stenhouse, L. (1981). What counts as research? *British Journal of Educational Studies, 29*(2), 103-114. doi: 10.1080/00071005.1981.9973589

The Critical Thinking Community. (2013). *A brief history of the idea of critical thinking.* Retrieved from: http://www.criticalthinking.org/pages/a-brief-history-of-the-idea-of-critical-thinking/408

Thoman, E., & Jolls, T. (2004). Media literacy: A national priority for a changing world. *American Behaviorist Scientist, 48*(1), 18-29. doi: 10.1177/0002764204267246

Thoman, E., & Jolls, T. (2008). *Literacy for the 21st Century: An Overview & Orientation Guide to Media Literacy Education (2nd ed.).* Retrieved from: http://www.medialit.org/sites/default/files/01_MLKorientation.pdf

Timmermans, J. A. (2010). Changing our minds: the developmental potential for threshold concepts. In J. H. F. Meyer, R. Land & C. Baillie (Eds.), *Threshold conceps and transformational learning* (pp. 3-19). Rotterdam: Sense Publishers.

Tiwari, A., Lai, P., So M., & Yuen, K. (2006). A comparison of the effects of problem-based learning and lecturing on the development of students' critical thinking. *Medical Education, 40*, 547–554.

TMOE (Ministry of Education, Republic of China, Taiwan). (2011). *University Act.* . http://law.moj.gov.tw/Eng/LawClass/LawAll.aspx?PCode=H0030001

TMOE (Ministry of Education, Republic of China, Taiwan). (2012a). *Reports: Ministry of Education White Paper on Education.* Retrieved from: http://english.moe.gov.tw/public/Attachment/212241653371.pdf

TMOE (Ministry of Education, Republic of China, Taiwan). (2012b). *White Papers: White Paper on Media Literacy Educational Policy.* Retrieved from: http://english.moe.gov.tw/public/Attachment/2122416591771.pdf

TMOE (Ministry of Education, Republic of China, Taiwan). (2013). *A MOE Policy Overview: MOE Policy Blueprint.* Retrieved from: http://english.moe.gov.tw/ct.asp?xItem=15708&ctNode=11410&mp=1

TMOE (Ministry of Education, Republic of China, Taiwan). (2014a). *2014 Education statistical indicators: Educational development— Universities, colleges & junior colleges.* Retrieved from: http://english.moe.gov.tw/ct.asp?xItem=14504&CtNode=11430&mp=1

TMOE (Ministry of Education, Republic of China, Taiwan). (2014b). *Electronic bulletin: 2014 higher education enrollment rates.* Retrieved from: https://stats.moe.gov.tw/files/chart/%e5%a4%a7%e5%b0%88%e6%a0%a1%e9%99%a2%e6%96%b0%e7%94%9f%e8%a8%bb%e5%86%8a%e7%8e%87%e6%a6%82%e6%b3%81.html

TMOE (Ministry of Education, Republic of China, Taiwan). (2014c). *Ministry of Education Objectives for 2015 (January- December).* Retrieved from: http://english.moe.gov.tw/ct.asp?xItem=16072&ctNode=11410&mp=1

TMW (Taiwan Media Watch). (2014). *Objectives and projects.* Retrieved from: http://mediawatch.org.tw/node/2898

TTB (Taiwan Tourism Bureau, Ministry of Transportation and Communications. (2015). *Discover Taiwan: general information.* Retrieved from: http://eng.taiwan.net.tw/m1.aspx?sNO=0000202

Uden, L., & Beaumont, C. (2006). What Is problem-based learning? In L. Uden & C. Beaumont (Eds.), *Technology and problem-based learning* (pp. 25-43). London: IGI Global.

Unrau, N. (2008). *Thoughtful teachers, thoughtful learners: Helping students think critically (2nd ed.).* Toronto, ON, CAN: Pippin Publishing.

Veenman, M. V. J., Van Hout-Wolters, B. H. A. M., & Afflerbach, P. (2006). Metacognition and learning: Conceptual and methodological considerations. *Metacognition Learning, 1*(1), 3-14. doi: 10.1007/s11409-006-6893-0

Vernon, D. T., & Blake, R. L. (1993). Does problem-based learning work? A meta-analysis of evaluative research. *Academic Medicine, 68*(7), 550-563.

Vygotsky, L. S. (1978). *The mind in society: The development of higher psychological processes.* Cambridge, MA: Harvard University Press.

Walker, G. (2013). A cognitive approach to threshold concepts. *Higher Education, 65*(2), 247-263. doi: 10.1007/s10734-012-9541-4

Webb, G. (1996). Becoming critical of action research for development. In O. Zuber-Skerritt (Ed.), *New directions in action research* (pp. 114-135). London: UK Falmer Press.

Wilson, C. (2012). Media and information literacy: Pedagogy and possibilities. *Scientific Journal of Media Education*. doi: 10.3916/C39-2012-02-01

Winter, G. (2000). A comparative discussion of the notion of 'validity' in qualitative and quantitative research. *The Qualitative Report, 4*(3&4), Retrieved from: http://www.nova.edu/ssss/QR/QR4-3/winter.html

Wismath, S., Orr, D., & MacKay, B. (2015). Threshold concepts in the development of problem-solving skills. *Teaching & Learning Inquiry: The ISSOTL Journal, 3*(1), 63-73. URL: http://www.jstor.org/stable/10.2979/teachlearninqu.3.1.63

Wood, D. (1998). *How children think and learn (2nd ed.).* Oxford: Blackwell.

Wood, D. F. (2008). Problem based learning. *British Medical Journal, 336*(7651), 971. URL: http://www.jstor.org/stable/20509616

Wood, S. (2006). Views of the effectiveness of problem-based learning. *Nursing Times, 102*(21), 34–38. Retrieved from: http://www.nursingtimes.net/Journals/2013/04/10/r/i/l/060423Views-of-the-effectiveness--of-problem-based-learning.pdf

Worsnop, C. (1999). *Screening images: Ideas for media education (2nd ed.).* Mississauga, Ontario: Wright Communication.

Wright, I. (2002). *Is that right? Critical thinking and the social world of the young learner.* Scarborough, ON, CAN: Pippin Publishing Corporation.

Yuan, H., Williams, B. A., & Fan, L. (2008). A systematic review of selected evidence on developing nursing students' critical thinking through problem-based learning. *Nurse Education Today, 28*(6), 657-63. doi: 10.1016/j.nedt.2007.12.006

Zull, J. E. (2012). Foreword. In J. Fried & Associates, *Transformative learning through engagement: Student affairs practice as experiential pedagogy* (pp. xi-xiv). Sterling: Stylus Publishing.