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Transforming Thinking through Problem-based Learning in the News Media Literacy Class: Critical thinking as a threshold concept towards threshold capabilities

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Abstract

This paper considers the extent to which critical thinking might be conceived of as a threshold concept which unlocks threshold capabilities in learners. Utilising a problem-based learning approach to pedagogy the paper reports a small scale study which was designed to explore whether students in a Media Literacy class could be supported to develop their critical thinking capabilities. The paper argues that such capabilities represent a threshold transformation in learners, unlocking as they do a new way of engaging with media literacy. Using Baxter Magolda's model of the development of critical thinking the study examines the extent to which students shift from a very egocentric view of the world to a more integrative and reflexive view of the world as their critical thinking capabilities become more sophisticated. The paper further argues that whilst critical thinking can be seen as a threshold concept it might also be viewed of as a threshold capability which is transferable across a number of domains - it transcends the discipline and might be considered to be a more complex threshold.

Keywords: Critical thinking, media literacy, threshold concepts.

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Introduction

Higher education furnishes students with knowledge and capabilities to deal with their lives and empowers them to contribute to rapidly changing societies (Wilson, 2014); integral to this is the exercise of professional insight to handle unforeseen situations. This claim suggests that learning is a transformative process associated with knowledge and the capacity to achieve understanding towards integration across disciplines. In media literacy, mastery lies in comprehending the interplay of the concepts of production, representations, languages, and audiences (Buckingham, 2003), fundamental to this is critical thinking, which serves as a pillar as well as the driving force, pushing students forward to acquire the capabilities to understand world issues. The nature of critical thinking corresponds to that of threshold concepts where transformation tends to be the most distinctive characteristic, for acquiring a threshold concept involves a continuous series of shifts. Progress can be made through effective teaching and learning (Beckton, 2009).

It has been established that problem-based learning (PBL) aims to promote critical thinking (Barrows and Tamblyn, 1980). In order to investigate the transformations associated with students' attainment of critical thinking, we might view the acquisition of critical thinking as having two phases or levels: 1) as a threshold concept providing the integrated general principles of critical thinking, and 2) critical thinking leading to threshold capabilities flexibly applied to specific fields. This paper argues for the integrated view of defining critical thinking encompassing the philosophical, psychological, and sociological traditions and adopts Baxter Magolda's (1992) epistemological developmental framework which echoes the four modes of variation in understanding threshold concepts identified by Meyer, Land, and Davis (2008). Threshold concepts and critical thinking are explicitly connected at a theoretical level, while at a pragmatic level, threshold capabilities allow pliant adjustment according to the domain-specific demand.

The evolving nature of threshold concepts

Central to the idea of threshold concepts is that it is the portal to the mastery and understanding of disciplines. Meyer and Land (2003a, p. 412) liken it to 'opening up a new and previously inaccessible way of thinking about something', according to which the conceptual gateway does not simply represent a fixed point that must be passed through, but rather it represents transformative progress. The emphasis is on conceptual development and ontological shift where grasping a subject matter involves transition, and this transformation of understanding proves to be troublesome. Difficulties in learning may be encountered, but once the threshold has been crossed, an understanding of a subject is likely to be initiated, which leads to integration into a web of interrelated phenomena and perspectives. However, across different disciplinary areas, the conceptual space may be restrained in specific academic territories, indicating the need to question the concept itself in order to achieve broader understanding.

Threshold concepts are characterised by Perkins (1999), Meyer and Land (2003a, 2003b, 2005, 2006), Land, Cousin, Meyer, and Davis (2005), Cousin (2006), and Meyer, Land, and Davis (2008) as transformative, reflecting changes in conceptual understanding, irreversible, referring to the unlikeliness of return to a time of not understanding, troublesome, meaning knowledge is conceptually difficult or troubling, integrative, bringing together complicated notions, and probably bounded, serving a specific and limited purpose (Smith, 2006). As the transformation is internalised, the discursive characteristic suggested by Meyer and Land (2005) gives rise to an enhanced use of language after a threshold has been crossed. For individuals, it is the course of refining and reconstituting self (Land, 2011).

Rowbottom (2007) criticised the defining characteristics of threshold concepts as vague and unclear. Though the threshold concepts framework has been studied at the theoretical level, few works have attempted to empirically explore how it might result in the development of capabilities required for dealing with new situations. Baillie, Bowden, and Meyer (2013, p. 228) advocate a Threshold Capability Integrated Theoretical Framework (TCITF) which brings together the 'episteme'— the system of ideas on which the threshold concept framework focuses, 'phronesis'— judgment making which capability theory emphasises, and 'techne'— technical skills. The TCITF framework links the attainment of threshold concepts, with the development of threshold capabilities 'that are in fact threshold to professional learning in a defined area of knowledge' (Baillie et al., 2013, p. 236) and Bowden's (2004) view of knowledge

capability meaning the ability to work out key aspects of a problem and relate the newly acquired knowledge to solve problems in novel situations through the experience of variation. This framework suggests that experiencing variation in unknown situations is more likely to enhance students' learning, where students should be encouraged to play the active role in exploration in authentic circumstances and reflect on their experiences. Learning is thus a process of ongoing meaning-making as learners go through a process of continual reconstruction of the self as they confront new challenges.

Starting from the threshold capability structure, the present paper then outlines how critical thinking might be defined as a threshold concept leading to threshold capabilities. It then considers how it might be applied in the media literacy context, and how the critical thinking capability framework speaks to the modes of variation in the threshold concept framework.

Critical thinking

Historically there have been different ways of conceptualising and operationalising critical thinking. Such variations emerged as a result of disciplinary or epistemological variations in the way that thought and reason are themselves defined. Moseley et al. (2005) suggests that clear and distinctive approaches to thinking are evident, for example, in philosophy, emphasizing, as it does, the theory of knowledge, psychology, with its interest in the cognitive processes associated with teaching and learning, and sociology considering the effect of social interactions on individual's thinking. Over the years these distinctive disciplinary approaches to critical thinking have been incorporated into more integrative approaches. Dewey (1910), for example, integrated philosophical approaches to thinking based on scientific enquiry with a consideration of the psychological aspects of problem-solving (Lipman, 2003). Bloom (1956) by contrast, developed a hierarchical taxonomy of intellectual thinking skills from memory of inert knowledge to evaluation which draws on psychological and sociological views of thinking. Others have argued that critical thinking is a skill set that includes fundamental abilities associated with the defence of decisions and justification of actions. Ennis (1993) lists those abilities and dispositions that critical thinkers need to have, and Fisher

(2001) argues that critical thinking is a skilful activity which meets various intellectual standards.

Unrau (2008) posits that in considering how critical thinking should be conceived of we should draw on Richard Paul's observations and suggests that critical thinking is evidenced by a progression from a narrow focus on logical argument to a wider range of perspectives in theory and practice, and incorporates a broader consideration of ideas. This complex definition of critical thinking brings together several of these disciplinary approaches in a more integrative way. It consists of subject-specific and general-based values and logic (Ennis, 1993; McPeck, 1981; Paul, 1985, 1987). Siegel (1988) maintains that both specific and general values are relevant to reasoned assessment and argues for critical thinking as reflecting a deeper epistemological understanding. Cottrell (2005) regards critical thinking as a complex mental process associated with skills and attitudes.

Baxter Magolda (1992) developed an epistemological model of critical thinking encompassing four stages of knowing from absolute knowledge, transitional knowing, independent knowing, to contextual knowing in recognition of her belief that knowledge is constructed. Integral to her developmental theory is self-authorship which integrates epistemological, intrapersonal, and interpersonal dimensions and is defined as a holistic meaning-making capacity (Baxter Magolda, 2009; Boes, Baxter Magolda & Buckley, 2010). Her argument denotes the transformative nature of meaning-making in learning with movement from mere dependence on external sources, crossroads, to a solely internal position (Barber, King & Baxter Magolda, 2013). Such a contextual consideration suggests that developing critical thinking is not limited to the transmission of knowing but transformation of thinking to metacognate and existent reflections (McGregor, 2007). The contextualised nature of critical thinking, on the other hand, implies the possibility of context-specific meanings and the difficulties in transferring between fields (Johnston, Mitchell, Myles, & Ford, 2011; Lipman, 2003).

Critical Thinking: a Working Definition

On the basis of the preceding discussion, this study utilises Baxter Magolda's model of critical thinking and defines critical thinking as:

1) epistemological development, which highlights the shift from absolute knowledge to contextual knowing,
2) a capacity to work with complex ideas, which requires in-depth justification of a judgment, the ability to expand one's background knowledge and beliefs to consider alternatives and then solve problems,
3) a productive activity which involves cognitive and affective progression,
4) a purposeful learning process in which knowledge is formed and related to its context, and
5) a notion tied to reflective thinking and metacognition.

Critical thinking as a threshold concept

Connecting the essence of threshold concepts with that of troublesome knowledge, Perkins (2008) interprets a threshold concept as akin to proactive knowledge inferring that a change takes place in the learner, instead of merely a reaction to what is learned, and applying it. This knowing goes beyond the simple relating of a learned concept to a specific discipline and moves towards an 'understanding of the subject discipline ideas integrated and transformed through the acquisition of theoretical perspective' (Davies & Mangan, 2008, p. 39). The concept of critical thinking in this sense is a threshold per se, for its constitution involves a web of complex dimensions. It signifies 5Cs— change (a process of movement), contestedness (involvement of different perspectives), convergence (integration of various notions), contextualisation (context sensitivity), and challenge (unceasing enquiry). These five C's are similar to the key characteristics of threshold concepts as identified by Meyer and Land (2005). Table 1 below presents a comparison of these two sets of characteristics. .

Table 1. A comparison of the characteristics of threshold concepts and critical thinking

Characteristics of threshold concepts	Characteristics of critical thinking
Transformative: change in conception	It is subject to dynamic epistemological shifts in the learning process.

Troublesome: knowledge is conceptually difficult	It concerns varied but related elements from different theoretical perspectives, which proves to be conceptually difficult.
Irreversible: unlikeliness to go back to innocence	It is unlikely to go back to the naïve state once reaching more sophisticated understanding. Nevertheless, given the oscillatory nature in learning, the demonstration may not be straightforward.
Integrative: bringing together complicated notions	It brings together various components and notions required for application and apprehension in different subject areas.
Bounded: serving a specific and limited purpose	It can serve a specific purpose in one field but can also be extended to other disciplines from alternative emphases based on its generic inclination despite the possible difficulty in transferability. It also implies questioning the given concept itself in learning.
Discursive: the enhanced use of language	After reaching a sophisticated stage in a particular domain, learners with criticality are able to use particular disciplinary discourses.
Reconstitutive: refining self	With the epistemological development, self-ontology is likely to change; however, in the early phases, the influence of others on self-identity cannot be totally excluded.

This comparison suggests that critical thinking as a threshold concept can be adopted in this discipline-specific research study and extended to other areas by means of modification for distinctive application. Individual learners are the focus in the process of refining self, but it is unrealistic to ignore the influence of others or the environment, especially at the early stages, because media literacy inherently requires the consideration of contexts when students are engaged in the media community.

Critical Thinking Threshold Capabilities Framework

In the current study, critical thinking is interpreted in two layers where the base level refers to a threshold concept as a theory, and another responds to threshold capabilities

where Baxter Magolda's model was adopted as the frame of reference for measuring whether students become critical thinkers:

1) Absolute knowing: the stage of acceptance— accept what is presented without critical consideration.
2) Transitional knowing: the stage of awareness— recognise what they know and how they know it. Students acknowledge that not all statements are out of question.
3) Independent knowledge: the stage of clarification— distinguish their own knowing from others'. Referring to experiences and the wider environment, students are able to consider different perspectives or interpretations of the same idea.
4) Contextual knowledge: the stage of evaluation— deeply reflect on their knowing in the frame of reference or context. Students are able to evaluate different perspectives by drawing on adequate evidence for meaning construction.

On the basis of Baxter Magolda's model, Moon (2008, pp. 199-200) illustrates how critical thinking is manifested:

1) Clear questioning of ideas and assumptions
2) Recognition of a historical or social context that may be influential on the response to the task
3) An introduction of the issue, an examination of the wording or context of it
4) Deep reflection

In the media field, critical thinking is integrated with four main components— questioning assumptions, detecting bias, analysing context, and seeking alternative points and sources of information (Kipping, 2000). The critical thinking capabilities framework as an evaluation rubric was then formulated with six categories of capabilities:

1) Questioning assumptions
2) Seeking alternative information
3) Self-reflection on limitations
4) Detecting bias from various sources
5) Analysis of context

6) Reflection on the wider context

Nurturing higher standards of thinking capability could facilitate students to connect with the requirements of modern settings (Lipman, 2003). In media literacy which involves an ability to analyse and synthesise rather than simply the memorisation and reproduction of facts and information , critical thinking plays a central role in the internalisation of the content, assessment of the quality of the internalisation which might be developed through real problems for meaning construction (Elder & Paul, 2010). Critical thinking knowledge capability interconnects with production, languages, representations, and audiences. Media literacy necessitates the capacity for making appropriate judgments to deconstruct messages and act in the real world, by virtue of which the critical thinking capabilities framework fits well. However, although Silverblatt (2001) describes media literacy as a critical thinking skill, there is a fundamentally clear-cut difference between critical thinking and the four key concepts of media literacy. The former is a threshold concept of integrated capabilities whose learning outcomes can bring about a new view of the content (Meyer & Land, 2003b), whereas the latter are content-based concepts. In the proposed framework, critical thinking interacts with knowledge capability where these content concepts are embedded.

Modes of Variation

Application of this framework does not suggest a generalised purpose for students' learning. Rather, variations always occur in the continuum. Meyer et al. (2008) identified four phases of variation in understanding threshold concepts as moving from the sub-liminal— variations in the students' tacit understanding, pre-liminal— variations in the students' incipient perceptions of a threshold concept, liminal— variation in the students' actual engagement with the threshold concept, in which integrating different perspectives occur, to post-liminal— variation in how students perceive the epistemological and ontological shift in passing the conceptual boundaries. Scheja and Pettersson (2010) use these phases to explain students' varying engagement with, and understanding of, the learning material that they encounter. Likewise they argue that, from a constructivist perspective, variations in the shift from the sub-liminal to the post-liminal represents developmental differences in the ability to contextualise knowledge... These contentions suit Baxter Magolda's model where students'

epistemological developments alter in particular contexts. The critical thinking threshold capabilities framework was thus established (Figure 1). During the process of learning troublesome knowledge, the liminal space students inhabit involves not only cognitive but emotional aspects (Cousin, 2006; Rattray, 2014; Rattray, in press). At the sub-liminal and pre-liminal stages, students could be more influenced by others, while after entering the liminal state, there may be identity conflicts between self and others, and even the former and the future self, as the evolving being emerges. Teaching which supports students to engage with the learning context and content is of importance in this respect.

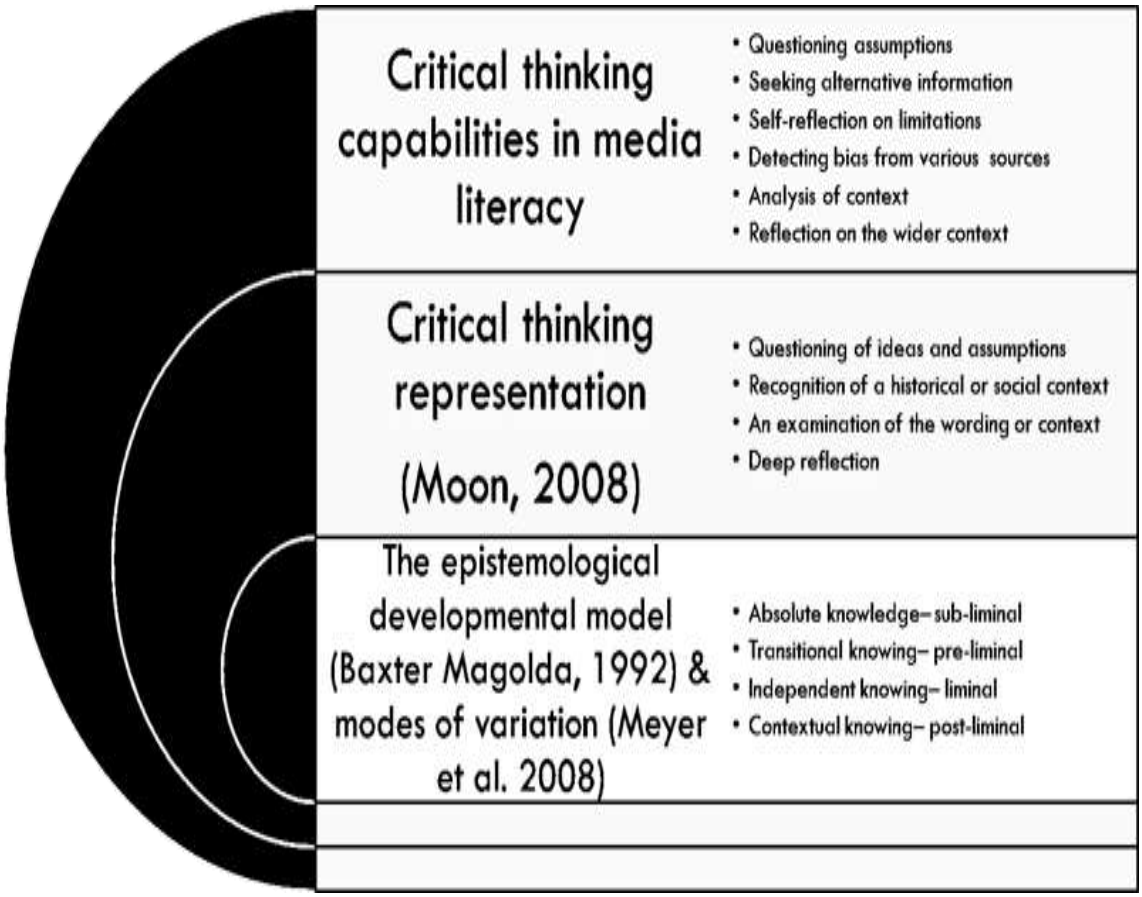
PBL in the Threshold Capabilities Framework

Meyer and Land (2005) consider student-centred teaching to be sensitive to variation in the way students engage with the context and content of learning. Problem-based learning (PBL) proposed by Barrows and Tamblyn (1980) emphasises a problem-solving approach that develops from the acquisition of knowledge and competence, which mainly flows from defining the problem, conducting research by referring to different resources, to evaluating the proposed solutions. It is a curriculum, a process, and a 'complex mixture of teaching philosophy and learning objectives' (Vernon & Blake, 1993, p. 560). Students are expected to become independent and proficient in a variety of capabilities through the facilitation of the teacher. Savin-Baden (2006) defines PBL as a threshold philosophy indicating its troublesome nature which not only generates disjunction but also promotes transformation for students and the teacher in the contested spaces of identity, knowledge, and power. PBL pragmatically supports students to know the wider parameters and consequences of the task in a 'liminal state' of uncertainty (Walker, 2013).

In the critical thinking threshold capabilities framework, critical thinking is the doorway to pass through to achieving understanding, and PBL triggers the access to the target, along each of the stations in the epistemological journey. PBL is a threshold approach or vehicle which drives the shifts in developing students' critical thinking as a threshold concept. This in turn leads to the threshold capabilities required to demonstrate knowledge capability in the subject area. This process involves teamwork as the various individuals' involved explore the new knowledge.

The current study explores the application of the model presented in figure 1 to determine the extent to which critical thinking might be seen as both a threshold concept and a vehicle to develop threshold capabilities. It utilises the pedagogy of problem-based learning as a tool to support the development of critical thinking in the media literacy classroom and as a way of supporting students' mastery of the critical thinking threshold concept.

Figure 1. Critical thinking threshold capabilities framework



Metholdology

Drawing on Cousin's (2009) 'transactional curriculum inquiry', Barradell (2013) highlights the complexities of identifying threshold concepts and deliberates on the methodological challenges by arguing for the importance of collaboration between

academics and students. Cousin (2010) also encourages research partnerships with educationalists, students and subject specialists. The teacher as a researcher is expected to become more critically responsive; hence action research was used to capture deeper insights from students' learning experiences. This study employed observation, questionnaire, and midterm and final focus group interviews involving 35 undergraduates in the one-semester news media literacy course in the English department of a southern Taiwanese university. Students' responses were gathered in relation to two main dimensions: 1) the ways students thought the curriculum contributed to the attainment of critical thinking, and 2) what they considered to be the difficulties and problems in learning in order to validate the assessment outcomes.

Findings

Students' Academic Performance

The results of this research indicate that the mean score for the student group-work, as measured by a number of variables relating to critical thinking, midterm assessment was statistically significantly lower than that of the final assessment on two variables. Descriptive statistics showed that students' midterm academic scores were the highest in seeking alternative points and sources of information but the lowest in self-reflection. In the final assessment, students received the highest academic scores in questioning assumptions but the lowest in reflection on the wider context. In contrast to what was found in group work, no statistically significant difference was found between the mean score of individual students' midterm assessment and that of the final assessment. Between students' group and individual performance, a statistically significant correlation was found in the midterm but not in the final (Table 2).

Table 2. Outcomes of students' formal academic performance

Group work	***Midterm assessment***	***Final assessment***
Mean score	M = 51.57, SD = 12.232	M = 62.57, SD = 8.039
Statistically significant difference (t = -4.806, df = 6, two-tailed p = .003, p < .005)		

Capability with the highest mean score	Seeking alternative points and sources of information (M = 3.214)	Questioning assumptions (M = 3.786)
Capability with the lowest mean score	Self-reflection (M = 1.643)	Reflection on the wider context (M = 2.643)
Individual work	***Midterm assessment***	***Final assessment***
Mean score	M = 72.29, SD = 6.071	M = 73.26, SD = 6.007
No statistically significant difference (t = -1.077, df = 34, two-tailed p = .289)		
Correlation between individual and group academic performances	Statistically significant correlation (r = .512, two-tailed p = .002)	No statistically significant correlation (r = .234, two-tailed p = .176)

In applying the proposed framework, Table 3 shows their transformation collaboratively and individually.

Table 3. Students' transformation in the midterm and final assessments

Scores	Group: above 80 Individual: above 90	Group: 70-79 Individual: 80-89	Group: 60-69 Individual: 70-79	Group: below 60 Individual: below 70
Threshold variation modes	Post-liminal	Liminal	Pre-liminal	Sub-liminal
Critical thinking epistemological development	Contextual knowing/ Evaluation	Independent knowing/ Clarification	Transitional knowing/ Awareness	Absolute knowledge/ Acceptance
Midterm (numbers of groups) n = 7	0	1	0	6
Midterm (numbers of individuals) n = 35	0	5	15	15
Final (numbers of groups) n = 7	0	1	3	3
Final (numbers of individuals) n = 35	0	4	21	10

In the midterm, most students stayed at the lowest stage, whereas in the final, most students moved up to transitional knowing. Fewer students engaged with critical thinking capabilities at the stage of independent knowing. From students' individual shifts, more students made progress, but a few students did not demonstrate improvement, manifesting their developmental variations (Table 4).

Table 4. Students' individual shifts in the midterm and final assessments

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

In addition to their formal assessment marks, those of students' group and individual works fluctuated (e.g. group M = 47.57→ 43.86→ 40.86→ 44.57) and generally remained at the two lower stages. The outcome resonates with the oscillation of learning; nonetheless, in the final assessment, students appeared to try harder to overcome past difficulties and improve their performance by learning from their previous experiences.

Students' Responses

Students reported in their questionnaire responses that PBL helped them to understand critical thinking. However, from the t-test analysis, their understanding of critical thinking did not show a statistically significant difference although the percentages of positive answers to both aforementioned questions increased after the intervention. It may imply that students considered PBL to be useful in developing their critical thinking regardless of whether they understood the concept of critical thinking. Students tended to report fragmented but overlapping elements, such as independent thinking, consideration of

different views, analysis, and judgment-making. At the end of the course, the feature of practicability and how critical thinking capabilities could be applied in news media literacy were mentioned in particular.

> *Critical thinking is helpful to the way we deal with different situations every day.* (Student)

> *When I read the news I don't like, I try to judge the news.* (Student)

The judgments might involve emotions. Students' remarks suggested that critical thinking capabilities learned in the classroom might be transferable to real life situations but this needs further exploration. The ambiguous responses became clarified in relation to the PBL treatment, for students directly pointed out the abilities to demonstrate critical thinking in media literacy, including detecting bias (frequencies =10) and seeking alternatives (frequencies = 8). For example, the idea of recognising bias was elaborated upon.

> *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.* (Student)

> *Some news media use some strong and negative words to describe the news events, showing the ideas they don't support.* (Student)

Students' comments on their impressions of the course were mainly positive. In the midterm focus group, 13 students emphasised how it had helped them develop their ability to recognise different views. Likewise 22 respondents in the final focus group recognised improvement in a wider variety of abilities relating to critical thinking and media literacy. only two students mentioned interaction and teamwork in the midterm focus group whareas seven students noted that working with peers supported the development of critical thinking in the final focus group. . This collaborative work particularly assisted them in solving problems for deeper investigation.

The introduction of the PBL curriculum to promote critical thinking was a brand-new experience for these students; it was therefore hardly surprising that learning would be troublesome. In the initial phase, students tended to be unsure about how they should tackle their studies because of the *complication* and *uncertainty that this approach brought with it.* Students reflected their uncertainty in relation to the lack of explicit

direction, including confusion about what topic they should choose, how to start, or if they used the method appropriately.

> *We are still confused about where we should go, what the focus should be. When we did our report, we just presented superficial things. We did not know where we should start to search information.* (Student)

It was not easy for them to commence undertaking their research, and after starting the study, succeeding questions might emerge.

> 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?' (Student)

Encountering difficulties was not necessarily a negative experience because students might have more opportunities to think through self-questioning. To pass through the stuckness, in the final writing, one student reflected as an audience by acknowledging alternatives to enhance tolerance in the globalised context.

> *Some Taiwanese media usually report negative news about China. It may create stereotyping or prejudice against 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. The best way is to avoid making prior assumptions before understanding.* (Student)

This student showed the potential for extending understanding to the broader environment. This finding suggested that achieving understanding in the media literacy classroom through critical thinking may facilitate deeper exploration.

The Teacher's Observation

In relation to critical thinking as a threshold concept, students questioned ideas and assumptions but neglected to mention limitations of current thinking. Students demonstrated critical thinking capabilities in media literacy by recognising different voices but did not analyse why audiences adopted some media representations and how audiences interpreted media. The parts students demonstrated corresponded to

their academic performance in considering different perspectives, whereas answering why and how questions requires the higher-order capability of deeper reflection.

Discussion

The data presented in this paper along with the literature introduced in the earlier sections of this paper would seem to imply that the critical thinking threshold capabilities framework addresses both theoretical and methodological challenges posed by some authors to the thresholds framework. First, with the embodiment of critical thinking, a threshold concept is a theory explaining empirical work rather than a concept comprising abstract ideas. Second, threshold concepts are not reduced to abilities but lead to capabilities required to reach mastery in particular subjects. Third, to fill the gap between students' academic performance and perceived abilities, multiple methods taking account of variations could be adopted. According to this framework, using PBL as a threshold approach to encourage the attainment of critical thinking as a threshold concept is helpful for contemplating the quality of teaching and learning. The teacher-as-researcher used the lens of threshold concepts to inspect how the essential threshold concept characteristics respond to teaching and learning practice in news media literacy. The illumination is presented as follows:

1) Transformative: Students generally moved from absolute to transitional or independent knowing states, indicating their epistemological shifts.
2) Troublesome: Critical thinking entails productive knowledge and a wide range of capabilities to be applied in media literacy. Due to the complexity, a number of students were still stuck at the two lower stages at the end of the course. Students passing through one liminal state, however, might face further challenges ahead.
3) Integrative: In principle, students could point out various components involved in critical thinking but tended to place more importance on particular elements while ignoring others. In practice, critical thinking capabilities facilitated them to integrate news media literacy with other topics. This feature of critical thinking as a threshold concept further brought about certain professional capabilities.
4) Irreversible: Between the phases, there were liminal spaces where students' demonstration of critical thinking oscillated, due to the difficulty of dealing with the intricacies. A series of moving back and forth but generally towards a forward

direction indicated that the developmental progression was neither straightforwardly irreversible nor merely cyclical with ups and downs.

5) Bounded: Students tended to confine their thinking to news in the initial phase but could relate critical thinking to other areas of study such as globalisation for examination near the end of the course.

It is recognised that the data presented in this paper is drawn from students' participation in a relatively short-term course and that this might constrain their mastery of critical thinking. Future studies need to extend this research to more groups of students and consider students ongoing development of critical thinking over a longer time-period. Whilst the outcomes of this study were not straightforward, students did appear to experience identifiable changes . in their critical thinking abilities however, Because of the constructivist nature of PBL, it was not easy to eliminate the interactions between team members and isolate the potential impact it had on individual students'.. The ideas of others' might have been the trigger to reconsider, refine and justify their own opinions. In implementation, at the preliminary stage of knowing, the contextual influence affected students' performance, while they became more confident in expressing themselves independently as the journey developed. Their self-autonomy emerged in the process of negotiating with the context but was subject to change over time. The implication is that, for the students and the teacher, the learning journey is an ongoing course of visiting and revisiting a new territory where a curriculum that embodies knowing, reflecting, and stretching is adopted; referring to the spirit of critical thinking, it is an excursion concerning change, contestedness, convergence, contexualisation, and challenge.

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