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Original Article

Learning Climate for Enhancing Innovative Behavior in Thai Higher Education

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Abstract

Developing innovative behavior among students is one of the approaches employed to produce quality human resources who could function well in the labor market. This research aimed to study the relationship between learning climate and innovative behavior of undergraduate students. A sequential explanatory mixed methods study was conducted in two phases. Quantitative data were collected from 609 students in a public university, Thailand, and qualitative data were collected from 15 student focus group who were categorized by the students' varying innovative behavior scores. The results from the quantitative phase revealed that the learning climate had both significant direct ($\beta = .34$, $p < .05$), and indirect effects on the students' innovative behavior through cognitive flexibility ($\beta = .44$, $p < .05$). In the qualitative phase, the reason why the learning climate had affected innovative behavior was explained. The results were categorized into three themes: learning climate support; motivation and interest; and adjustment in the work process. The quantitative and qualitative findings from the two phases indicated that the suitable management of learning climate caused the students to demonstrate innovative behavior both directly through climate for learning, and indirectly through their interest in the assignments. This resulted in the students' intention to adapt their work methods to render the most valuable outcomes. The cognitive flexibility of the thinking process also enabled work behaviors that were more innovation driven. These research results could be used by institutes as a framework to design training, particularly in subjects with a primary focus innovation development.

In recent years, several professions have disappeared or replaced by robots and artificial intelligence (World Economic Forum, 2016). However, Thai higher education institutes are still producing graduates to work in professions that will eventually cease to exist or possess the skills and body of knowledge that will soon become obsolete with regard to fulfilling the demands of the labor market (Chaimongkhol et al., 2018). Therefore, developing the potential of students to match the demands of the labor market is a key challenge for Thai higher education. Chang and Yang (2012) and Li and Wu (2011) propose 'innovative behavior' (IB) as one of the most important qualities that institutes need to encourage their students to obtain. This behavior refers to one's demonstrated intention to search for possible ideas to help formulate and develop new products, processes and methods that can be positively beneficial for themselves as well as others (De Jong & De Hartog, 2010). Even though IB is crucial in the way one pursues academic and professional goals, the research points out that such behavior is still something that people of both school and working ages still lack (Chen & Chen, 2012). This finding corresponds with that of Sangsuk (2014), who studied the IB of students in the senior year of college in Thailand and found that the students demonstrated a lower level of IB compared to other qualities. Such signs are indicative of the need for Thai higher education institutes to create a 'learning climate' (LC) that

can better encourage their students to develop and demonstrate more IB. Although a considerable number of previous studies have identified the impact of LC on IB (e.g., Meksuwan, 2016; Shanker et al., 2017, Hunter et al., 2007), the level of LC in the Thai higher education context that effectively enables the demonstration of IB appears to be below average, particularly in comparison with other factors (e.g., Meksuwan, 2016; Sangsuk, 2014).

Nevertheless, despite some attempts in the past research to look into the factors affecting IB in several different contexts (Chen & Chen, 2012; Sangsuk, 2014; Jeong, 2016; Shanker et al., 2017), the development of IB depends on interactions of factors, from individual factors (thought patterns, feelings) to contextual factors (Chumkesornkulkit & Wichian, 2018) The precise evidence about how individual and contextual factors influence such behavior remains inconclusive, and there is a dearth of knowledge about how contextual support affects IB in Thai higher education. The study of the effect of individual and contextual factors on IB, as well as the characteristics of its relationships, and possible ways to help facilitate a suitable LC, will help expand the body of knowledge related to IB. These studies will eventually lead to the design of learning activities and processes that effectively and efficiently motivate a person's development of IB in the future.

For this reason, this research aimed to study the LC that affects the IB of students in a Thai higher education institute. The study adopted an explanatory sequential mixed-method design. The initial quantitative causal model was followed by a second phase of qualitative research based on focus groups. The objective of the quantitative phase was to examine how the LC had direct and indirect effects on the students' IB, and the mediating effects of 'cognitive flexibility' (CF), which is an advanced cognitive system with research findings indicating its effects on IB (Jeong, 2016), on the relationship between LC and IB. On the other hand, the research questions of the qualitative phases referenced the results obtained from the quantitative results, and were as follows: 1) how can one support a suitable LC to enable the demonstration of IB? and, 2) what are the effects of LC and CF that enable students' demonstration of IB?

Literature Review

Social Cognitive Learning Theory

Social cognitive learning theory focuses on an individual's demonstrated behaviors. It highlights an individual cognitive concept developed from an environmental context and demonstrated behaviors (Bandura, 1999; Nabavi, 2012). Social cognitive learning theory believes that an individual's behaviors are usually developed through his or her observations or copying the originals behaviors seen in the environment the person is living in, such as those demonstrated by friends or teachers, as well as symbolic models in different forms of media such as news, and lessons in both verbal and textural form. The occurring learning process does not happen straightforwardly but associates itself to the cognitive process of each individual. Despite different individuals having similar learning experiences, those individuals may demonstrate different behaviors (Bandura, 1999; Nabavi, 2012). According to social cognition theory, the demonstrated behaviors can be explained using personal and environmental factors. The key variables are the personal factor that affects students' IB, which is their CF, and the environmental factor, which is the LC in the higher education institutions.

Innovative Behavior

A great amount of research has been conducted to explore several aspects of IB and try to bring to the fore a better understanding that can ultimately lead to an individual's development of IB (e.g. De Jong & De Hartog, 2010; Janssen, 2000; Messmann & Mulder, 2012; Scott & Bruce, 1994). IB refers to putting an individual's expression of ideas in the creation and application of ideas into actual practice (Scott & Bruce, 1994). Janssen (2000) proposes another definition of IB that is more specific to the work-related contexts, which is the term "innovative work behavior". The proposed definition refers to an individual's actions demonstrated or practiced with the intent to initiate new ideas, and present and practice such ideas creatively to generate maximal benefits for the job within a more work-related context. It is obvious that this concept interprets IB in terms of a person's willingness to create their own work, which corresponds with the concept of this research, whose aim was to study students' IB demonstrated during the execution of the tasks assigned as a part of their learning activities and

research projects. Subsequently, this research focused on the study of IB that refers to students' demonstrated actions, particularly those with creative intent and initiative to bring about changes through the formation of ideas, methods, approaches and products along with an attempt to come up with possible ways to enable actual application or practice.

Janssen (2000) and Scott and Bruce (1994) divided the development of IB into the following three processes: 1) generation; 2) promotion; and 3) realization. Nevertheless, there has been some research that proposes categorization into other sub-processes, particularly in the generation phase, for it can help give a better explanation of the process of IB. De Jong and De Hartog (2010) divided the original concept of generation in the development of IB into two other dimensions: opportunity exploration and generation. As a result, the development of IB can also be divided into four processes; 1) opportunity exploration; 2) generation; 3) championing; and 4) application. Opportunity exploration is the initial phase of IB, which is when an individual expresses the desire and intention to explore opportunities for developing processes, methods, or products into value. The generation process is when the individual begins generating new ideas and approaches that can be used to overcome problems and obstacles. The individual then enters the championing stage, which is a socialization process where one seeks others' validations in order for their ideas to be realized into practical solutions. The last step involves propelling one's idea into something that is more tangible, which can be done through pilot experiments or creations of prototypes. Therefore, to better explain generation as a phenomenon in more elaborate detail, this research set out to study IB according to the proposed concept of De Jong and De Hartog (2010).

Learning Climate

LC enables students to achieve positive outcomes from effective learning processes, the ability to develop creative problem-solving skills, the motivation to learn, and self-efficacy (Chang & Yang, 2012; de Souza Fleith, 2000), which can all enable students to develop new ideas and innovations (Chang & Yang, 2012). It is sometimes used interchangeably with learning environment (Irby, 2018; Genn, 2001). LC can be referenced in various aspects. For instance, LC can refer to how the learning management system of an education institute impacts students' achievements (Goodyear, 2005) or how the physical structure and relationships of individuals affect students' learning experiences (Carvalho & Goodyear, 2017; Goodyear, 2001). In addition, LC also refers to a context that encourages creative thinking and behaviors to create and develop work (de Souza Fleith, 2000; Sangsuk, 2014). The concept of de Souza Fleith (2000) and Sangsuk (2014) corresponds with the aims of this research, which focus on the importance of LC in the support of the cognitive process and IB. This study adopted the definition of LC proposed by Sangsuk (2014) who divided LC into four components that enable creative thinking and IB: 1) creativity stimulation to encourage a challenging learning atmosphere with novel learning activities; 2) thinking promotion to open up opportunities to think and exercise the thought process at a more complex level; 3) a positive learning atmosphere to create a positive emotional environment in the classroom; and 4) class participation in a collaborative LC to develop a sense of ownership over the learning process.

Previous studies have suggested that the LC can create a positive learning experience for learners. It also affects their cognitive product creation behavior (e.g., Kleebbua & Siriparp, 2016; Rongmuang, 2019), and IB (e.g., Hunter et al., 2007; Meksuwan, 2016; Sangsuk, 2014; Shanker et al., 2017). For instance, in the meta-analysis carried out by Hunter et. al. (2007), it was found that LC is an effective predictive variable used to explain a student's performance. This finding is consistent with the research results of a study conducted in the Thai higher education context. Rongmuang (2019) revealed that LC is related to an increase in the level of Thai student nurses' cognitive processes, creative, and innovative skills. Additionally, Sangsuk (2014) pointed out that LC has both direct and indirect effects on students' IB. In conclusion, students who have a good learning experience in a suitable LC are likely to demonstrate IB. Therefore, the following hypothesis was tested:

Hypothesis 1. Learning climate is positively related to innovative behaviors.

The Mediating Effects of Cognitive Flexibility

CF is an advanced mental capability (Bernardo & Presbitero, 2018; Slegers et al., 2009). CF refers to an individual's awareness in a changing situation

and awareness of possible alternative ways to appropriately respond to different conditions of the situation. The person must be willing to invest time and effort to generate choices or ideas to create opportunities for success. The person must be confident in their own ability to apply a method to best suit the situation (Martin & Rubin, 1995). This study adopted a definition of CF according to the one proposed by Martin & Rubin (1995), which was divided into four components: 1) awareness in a changing situation; 2) alternatives available; 3) willingness to adapt to the situation; and 4) self-efficacy in being flexible. An individual with CF is able to acknowledge alternatives and flexibly correspond with the changing goals, as well as readjust ideas and control behaviors to achieve objectives with methods that effectively coincide with the changing conditions of a situation (Bernardo & Presbitero, 2018; Curran, 2018; Curran & Andersen, 2017; Dennis & Vander Wal, 2010).

CF plays a significant role in the explanation of individual behavior (De Dreu et al., 2011; Ionescu, 2012; Martin & Rubin, 1995; Jeong, 2016). Some past research (eg. Bernardo & Presbitero, 2018; Slegers et al., 2009) has also indicated that CF is an ability which can be developed through one's participation and exposure to motivational activities and environmental processes CF also contributes positively to a person's creativity, innovative thinking and IB (Curran, 2018; Curran & Andersen, 2017; De Dreu et al., 2011; Ionescu, 2012). In addition, as pointed out the research by Jeong (2016), CF is an essential mediator variable, which can be used to explain one's demonstration of IB. In line with these concepts, this research proposes that there is an indirect effect of CF on the relationship between LC and IB. Therefore, the following hypothesis was posited.

Hypothesis 2. The effect of learning climate on innovative behavior will be mediated by cognitive flexibility

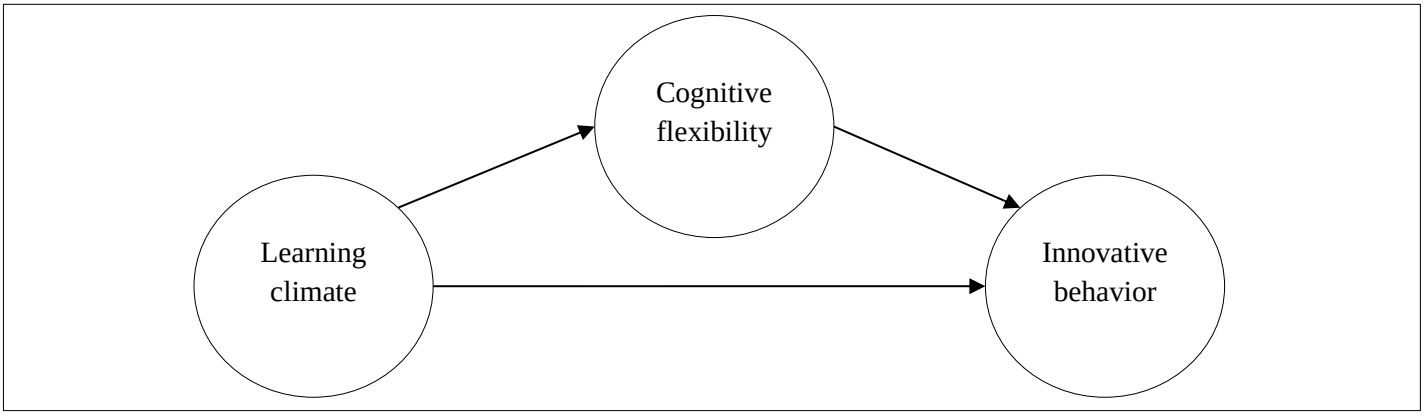
Upon completion of a literature review on the effect of LC on students' CF and IB, the researcher developed the research framework and hypotheses for this study. The research framework is shown in Figure 1. The main theoretical concept in this study was social cognitive theory, which explains an individual's behaviors by using personal and environmental factors. The environmental factor, namely the LC in higher education institutions, has a direct effect on IB. In addition, the personal factor, CF, has an indirect effect on the relationship between LC and IB.

Methods

This research was carried out using sequential explanatory mixed methods, consisting of two major phases (Creswell & Plano Clark, 2018). The research began with the quantitative phase, where quantitative data was collected from the participants before analysis of the causal model of IB was conducted to help investigate the direct and indirect effects of LC on IB through CF. The qualitative phase was then carried out to create a better understanding of the analysis results obtained in the quantitative phase. A focus group

Figure 1

The Conceptual Framework



was employed with three groups of five students, categorized according to their IB scores (high, intermediate, and low). Finally, the results from the quantitative and qualitative phase were interpreted, and they are presented in the discussion part of the research

Quantitative Phase

Sample and Procedures

Using a stratified random sampling method, the data in this phase was gathered in September 2019 from the participants. The eligible 609 sets of questionnaires accounted for 93.69% of the total number of questionnaires that were sent out. A majority of the samples were female, which was equal to 77.20% (n = 470) of the eligible samples, whereas the male samples accounted for 22.80% (n = 139). All the participants were studying in the senior year of the university at the time they participated in the research. The data also revealed that 33.33% (n = 203) of the samples were studying in the field of science and technology, 33.33% (n = 203) were pursuing their education in the health sciences and the remaining 33.33% (n = 203) in humanities and social sciences. The GPA of each participant was between 2.00 and 4.00 (overall: M = 3.19, SD = 0.42; science and technology: M = 2.90, SD = 0.43; health sciences: M = 3.26, SD = 0.29; humanities and social sciences: M = 3.38, SD = 0.32)

Measures

To measure IB, the researcher developed an IB scale (Thai version) based on a concept outlined by De Jong and De Hartog (2010) to measure IB from the participants' work methods utilized by participants for different assigned projects, research, and tasks in their past academic lessons and activities. All items were scored using a five-point rating scale ranging from "least" (1) to "always" (5). The 16-item IB scale encompassed the following four dimensions: 1) opportunity exploration (α = .83), (four items, e.g., "Do you often explore the potential problems that can be obstructive to the way you handle an assigned task?"); 2) generation (α = .79), (four items, e.g., "Do you make an effort to search for new possible concepts to create better work or deliver better final results?"); 3) championing (α = .88), (four items, e.g., "Do you persuade your instructors and classmates to see the benefits of new possible approaches that you deem as good?"); and 4) application (α = .88), (four items, e.g., "Do you find ways to materialize a concept into a tangible outcome through an actual practice?").

To measure CF, the researcher developed a CF scale (Thai version) according to the concept proposed by Martin and Rubin (1995). All items were scored using a five-point rating scale ranging from "strongly disagree" (1) to "strongly agree" (5). The 14-item CF scale consisted of four dimensions: 1) awareness (α = .87), (three items, e.g., "You are aware of the possible factors contributing to possible changes of a situation"); 2) alternatives (α = .79), (three items, e.g., "You believe that there are several methods that can be utilized to effectively manage a situation"); 3) willingness (α = .80), (four items, e.g., "You make an effort to find a solution to the problem despite it being a challenging situation"); and 4) self-efficacy, (α = .88), (four items, e.g., "You believe in your own ability to adapt your ideas and mindset to effectively handle a situation.")

To measure LC, the researcher developed an LC scale (Thai version) based on a concept outlined by Sangsuk (2014). All items were scored using a five-point rating scale ranging from "strongly disagree" (1) to "strongly agree" (5). The 16-item LC scale consisted of four dimensions: 1) creativity stimulation (α = .82), (four items, e.g., "Questions/ activities from instructors encourage you to exercise your thoughts"); 2) thinking promotion (α = .80), (four items, e.g., "The classroom climate enables you to exercise your thought process and make rational decisions"); 3) positive learning atmosphere (α = .85), (four items, e.g., "When the program/ university organizes an activity to create new learning experiences, you are eager to join."); and 4) class participation (α = .89) , (four items, e.g., "You take part in a learning activity from the beginning until the end.").

Qualitative Phase

Participants

After the completion of the quantitative data analysis, the researcher's selection of participants for the focus group was done by specifically referencing the students' IB scores. The students with scores lower than the 25th percentile and higher than the 75th percentile were chosen to participate in the focus groups whose participants were categorized according to their low and high IB scores, respectively. The students with scores

in between were chosen to participate in the focus group of participants with intermediate scores. Each group included five students/group, and each focus group took an average time of 60-90 minutes to carry out.

Data Collection

The qualitative phase was done by using focus groups with the participants. Open-ended, semi-structured questions were used for data collection. The content of the questions was grounded in the quantitative results from the first phase of the study, aiming to understand why the LC had effects on students' CF and IB. One question explored the learning activities and teaching methods that most lecturers used to facilitate their students in the learning process: "What teaching styles were used most by teachers?". Three questions explored the attitudes, beliefs, and methods used in work processes and problem solving when teachers gave assignments: "What was the work method you employed to complete the assigned tasks?", "What do you think were the factors contributing to the demonstration of such behaviors?", and "What was the method of thinking or belief you employed in your study and work?". As the focus group interview progressed, probing questions—such as "Why?" and "Could you elaborate?"—were presented on the basis of the participants' responses to enhance the depth of their experiences.

Data Analysis

The researcher interpreted, defined, and connected the obtained data, before systematically reorganizing the data while referencing a number of quotes from which the interpretation originated throughout the process of the research. A content analysis was also carried out. To inspect the credibility of the data, the researcher employed a member check technique, which required the participants of the focus group to do an inspection after each discussed issue had come to an end to confirm the accuracy of the information. The data triangulation technique was also employed. Once the researcher had obtained the data from the focus group, this data was later confirmed with the instructors supervising the particular programs which the discussions had referenced. (Creswell & Miller, 2000; Creswell & Poth, 2018; Somekh & Lewin, 2005).

Results

Quantitative Phase

The initial data analysis was carried out using descriptive statistics. Mplus was used to run a set of measurements model and causal model. To test Hypotheses 1, analysis of the IB model was conducted. The researcher selected the maximum likelihood (ML) estimation. The following fit indices were used: $\chi 2$, root mean square error of approximation (RMSEA), comparison fit index (CFI), Tucker-Lewis index (TLI), standardized root mean square residual (SRMR). The values of CFI and TLI > 0.95, and of the SRMR and RMSEA < .08 were interpreted as a good fit (Hair et al., 2010). In addition, the researcher proceeded with analysis of the mediation effects of CF in Hypothesis 2 by bootstrapping procedures and the Sobel test (Baron & Kenny, 1986; Sobel, 198

Descriptive Statistics

Table 1 presents the means, standard deviations, and correlations between the study variables. The researcher conducted confirmatory factor analysis (CFA) to establish a valid measurement model prior to testing the causal model. The ML estimation was selected. These results showed that the three measurement models had good fit. The fit indices of the IB measurement model, ($\chi 2$ = 0.61, df = 1, p = .43, RMSEA = .00, CFI = 1.00, TLI = 1.00 SRMR = .01), showed that the hypothesized four-factor model had good fit. The fit indices of the CF measurement model, ($\chi 2$ = 1.68, df = 2, p = .43, RMSEA = .00, CFI = 1.00, TLI = 1.00, SRMR = .01), showed that the hypothesized four-factor model had good fit. The fit indices of the LC measurement model, ($\chi 2$ = 0.42, df = 1, p = .52, RMSEA = .00, CFI = 1.00, TLI = 1.00 SRMR = .01), showed that the hypothesized four-factor model had good fit. The obtained data shows that the three measurement models were comprised of dimensions that were theoretically consistent with the composite reliability of .86, .88 and .91, respectively and higher than .70 (Hair et al., 2010). This implied that the internal dimensions of each of the three measurement models had adequate internal consistency for the measurement of IB, CF and LC. Citing the aforementioned results, it could be concluded that the three measurement models had adequate reliability and validity for the research to proceed to the next phase.

Table 1

Means, Standard Deviations and Zero-Order Correlations

Variables	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11
1.OE	3.86	0.61											
2. Generation	3.78	0.69	.68*										
3. Championing	3.60	0.79	.52*	.67*									
4. Application	3.67	0.72	.60*	.70*	.69*								
5. Awareness	4.12	0.64	.43*	.35*	.23*	.35*							
6. Alternatives	3.93	0.62	.53*	.58*	.47*	.54*	.52*						
7. Willingness	3.89	0.61	.56*	.65*	.52*	.63*	.52*	.73*					
8. Self-efficacy	3.89	0.62	.46*	.51*	.43*	.51*	.44*	.63*	.69*				
9. CS	3.96	0.67	.49*	.54*	.47*	.48*	.37*	.51*	.59*	.48*			
10. TP	3.92	0.65	.49*	.54*	.45*	.52*	.36*	.51*	.61*	.52*	.78*		
11. PLA	3.86	0.70	.47*	.57*	.55*	.57*	.27*	.50*	.58*	.49*	.69*	.72*	
12. CP	3.81	0.69	.45*	.55*	.55*	.57*	.25*	.44*	.57*	.50*	.70*	.70*	.76*

*Note. *p< .05, OE* = Opportunity exploration, CS = Creativity stimulation, TP = Thinking promotion, PLA = Positive learning atmosphere, CP = Class participation

Test of Hypotheses

The hypothesized relationships were tested simultaneously by using structural equation modeling (SEM). The path diagram of the IB model is shown in Figure 2. The indices of this model had the following results: ($\chi 2$ = 52.22, *df* = 38, *p* = .06, RMSEA = .03, CFI = .99, TLI = .99, SRMR = .02), which showed the estimated model provided a good fit to the data. In the testing of Hypotheses 1 and 2, the results showed that LC influenced IB in a positive way, with direct effects on IB (β = .34, *p* < .05) which provide support for Hypothesis 1, and indirect effects through CF (β = .44, *p* < .05) which provide some initial support for Hypothesis 2. Furthermore, to test the mediating effect of CF, the Sobel Test (Sobel, 1982) was conducted. The results confirmed that the association between LC and IB was significantly mediated by CF (*z* = 7.18, *p* < .05). A bootstrap analysis was conducted to examine the indirect effects of LC on IB through CF, with 10000 resamples. The ML estimation and 95% bias corrected confidence intervals (CI) were employed to assess the indirect relationship between LC on IB through CF. The results (coeff = 0.44, CI = [0.35, 0.53]) excluding zero indicated that there was a significant indirect effect of LC on IB through CF. The proportion of indirect effects of CF from the total effects of LC on IB (indirect effect/direct + indirect effect * 100) was equal to 56.79% (Sobel, 1982). Therefore, these results provide support for Hypothesis 2.

Qualitative Phase

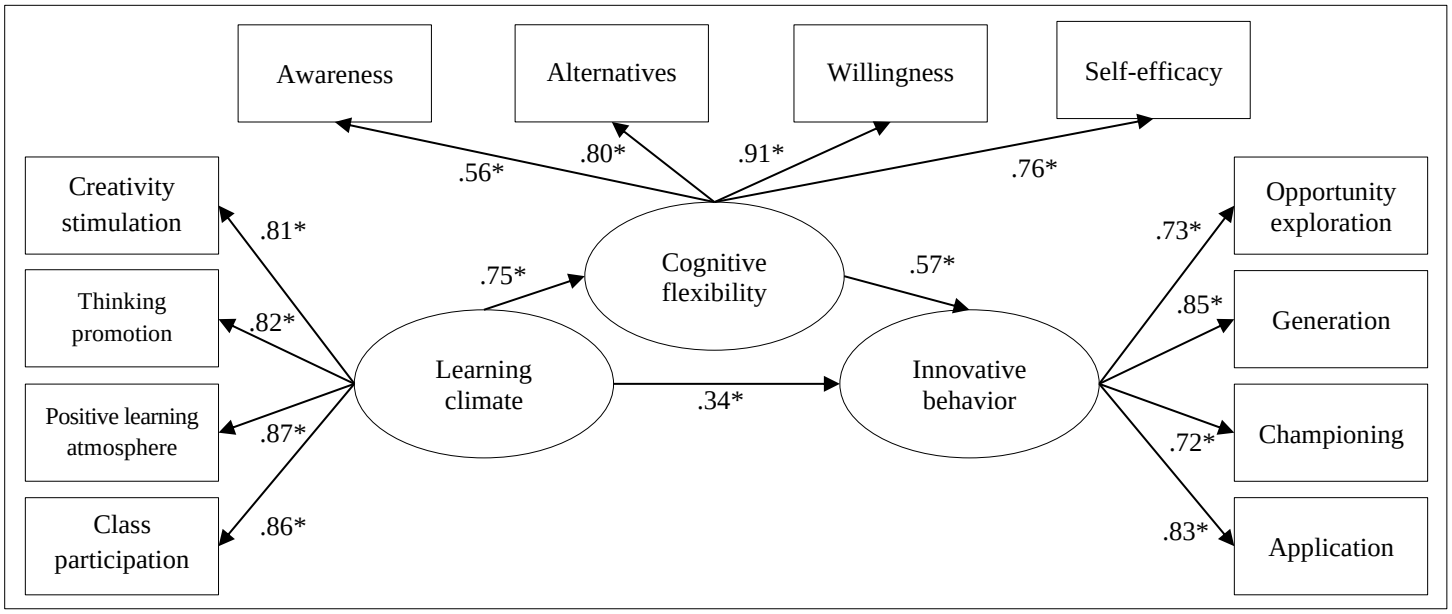
The focus group was carried out with three sub-groups categorized according to the students' overall scores of IB to identify obvious similarities and differences in the learning processes used by each group. The first group, with a high average IB scores of 4.40 (*SD* = 0.47), was comprised of five senior students pursuing their education in the health sciences (four females and one male). The second group, with an intermediate average IB scores of 3.80 (*SD* = 0.62), was comprised of five female senior students from the humanities and social sciences. The third group, with a low average IB scores of 3.19 (*SD*= 0.68), was comprised of five female senior students studying in the field of health sciences. The results obtained from the content analysis were extracted and categorized into three themes: 1) learning climate support; 2) motivation and interest; and 3) adjustment in the work process. The themes are elaborated as follows.

Learning Climate Support

The three groups of students discussed the teaching methods and LC of the programs in which they had enrolled in during the past three years, and how they enabled them to accumulate learning experiences through their participation in learning

Figure 2

The Innovative Behavior Model with Standardized Path Loading



Note. $*p < .05$

activities as they developed positive emotional experiences. They also developed a sense of ownership over the learning process and the methods, which helped stimulate them to practice their advanced thinking process. The groups with high and intermediate scores cited the characteristics of the assignments, which mostly required hands-on practices. They also searched for new knowledge to find new possible solutions, which were shared and discussed in the classroom. Most of the assignments were derived from situations which they would likely encounter in their daily lives and professional practices. The approaches, which could potentially lead to the right solutions and answers, relied on the rationality behind the methods the students appropriately employed, according to the different contexts of different situations. "Most of our assignments come from the actual situations. They require us to think beyond what we have learned" (High IB group).

The tasks of the students in the low score group often follow a premeditated guideline, which consequently prevented them from fully demonstrating their potential. "Most of our classes were lectures and labs. The professors would normally demonstrate how each step of the process was done. We would have to create the exact same outcomes" (Low IB group).

In terms of instructors' suggestions and feedback, the students in the groups with high and intermediate IB scores pointed out that most of their instructors never made any instant judgments about their ideas or work. What they did was ask them questions that encouraged them to rationally reexamine their thought process, advising them to look at the problems in other possible and more comprehensive aspects. These questions would gradually guide them to find the right answers. In the meantime, students in the group with low IB scores rarely experienced such a method:

> When we joined a group discussion, the professors never judged which opinion was right or wrong but they would encourage us to think by asking us why we thought a certain way. They guided us towards the conclusion to help us find the right answers. (High IB group)

In addition, the students in the group with high and intermediate IB scores discussed the classroom atmosphere where professors designed interesting learning experiences with relatable content that kept the classroom fun and active while constantly encouraging students to exercise their thoughts. Not only that, this learning atmosphere included unofficial competitions that were going on between classmates, where everyone was encouraged to answer the professors and classmates' questions:

> Even if it was a lesson which was a lecture and we would normally feel sleepy, bored or distracted, the professor would come up with activities that encouraged us to learn and think about what was being taught in the lecture. (High IB group)

Motivation and Interest

The motivation and interest in the assigned tasks played a significant part in the way the students in the high and intermediate score groups demonstrated their IB, particularly the internal motivation which originated from appreciation in the values of the task. The motivation stimulated the students' dedication to develop ideas that were more diverse, in order to find suitable methods for an assigned task. "I've never really felt like it was a waste of time. I knew that my effort would be helpful in developing my career" (Intermediate IB group).

Appreciation of the value of the assigned tasks played as an equally an important role as the students' motivation to achieve something that brings self-pride. All three groups felt proud while talking about their success in doing something and getting a sincere compliment for it. This could boost confidence in their skills and abilities:

> There was this great sense of pride when I was able to do something, to express my opinions and answers. I would walk back to my desk feeling so proud of myself if I felt like I has done well at the presentation or discussion. (High IB group)

Adjustment in the Work Process

A majority of the students adjusted their work methods to better correspond with their thinking methods. They planned and scheduled their work process. Most of them realized the necessity to readjust and improve their work process to be more consistent with their intention to deliver a valuable outcome. Students in the group with high IB scores often created an action plan to systematically manage the time for their classes and assignments:

> Since the semester started, we've listed events in the university's calendar and our class schedules in our own calendar. Also, we have looked in further detail how we can find time to study, find dates for group assignments, do research, rest, etc. (High IB group)

Students in the group with high IB scores revised their plans according to their past mistakes by themselves. By reflecting on and locating their mistakes, the students were able to improve their future plans and discipline themselves to follow them better:

> I planned the time to study but I couldn't do things as I had initially planned. But I did notice that I'm quite a slow reader. That's my weakness. So, I had to plan everything all over again. (High IB group)

Discussion

The quantitative results point out that the LC has a direct effect on students' IB. It was shown that the LC where students could participate in the thinking process encouraged them to develop an advanced level of thinking process and have a positive emotional experience during their learning. It also instilled a sense of ownership over the learning process, which enabled the students to demonstrate IB in both the classrooms and the assigned tasks. However, there was also an indirect effect of CF on the relationship between LC and IB. This result showed that such behaviors did not merely originate from activities in classroom but through the students' thinking process. CF also allowed students to demonstrate learning and working behaviors that better corresponded with their own thinking method, which was driven by IB. This finding was in accordance with that of Jeong (2016), who discovered that CF can be used to explain the incremental belief process. As a mediator variable, such a process had significant impact on the development and demonstration of IB. The quantitative results also revealed that the indirect effects of CF account for 56.79% of the overall effects, reaffirming its role as a mediator variable, which ultimately influences the development and demonstration of IB.

The qualitative results help to explain why the LC contributes to IB. It encompasses the following questions: 1) How can one support a suitable LC to enable the demonstration of IB? and 2) What are the effects of LC and CF that enable students' demonstration of IB? With regard to approaches employed to "support learning climate", the qualitative results showed that the characteristics of the assignments, instructors' suggestions and feedback, and classroom atmosphere were all part of an important strategy for dealing with a class to

facilitate a suitable LC (a suitable LC that enables IB consists of four components: creativity stimulation, thinking promotion, positive learning atmosphere, and class participation). In addition, the reason that LC and CF influence students' IB can be explained as follows. The LC drives the students' motivation and broaden their interest in the assigned tasks. The motivation enabled the students to put their effort into thinking for different ways to successfully handle the assigned work. During the work process, they plan and learn to adjust their work method to better correspond with their thinking methods. This finding is in accordance with the research of Li et. al. (2015), who studied how and why teachers of the digital generation use technology in the classroom. The research points out that when an individual (a teacher) acknowledges the positive effects of a certain thing (technology), he or she tends to demonstrate such behaviors.

The results of both the quantitative and qualitative phase help us to gain an in-depth understanding of the relationship between the LC and IB of students in Thai higher education. To further elaborate, the students' demonstration of IB is a result of the effects of LC management where students are encouraged to participate and engage in learning activities that allow them to exercise advanced levels of thinking. They are also able to gain positive learning experiences about learning atmosphere and a sense of ownership in the learning process. The important approaches that contribute to the LC support in successfully enabling the development of IB include the characteristics of the assignments, instructors' suggestions and feedback, and classroom atmosphere. Such an approach creates a greater tendency for students to develop a higher level of CF. Their thought process is constantly stimulated to develop an interactive mechanism that connects the accumulated experiences to different possibilities in future situations. Such ability allows them to readjust or reinterpret the information to better suit a changed scenario (Ionescu, 2012). In addition, students who are able to develop CF in their thinking process will be able to improve their work methods, which are driven by their own IB. Students with CF tend to be able to come up with several possible ways to manage and handle a situation. They also possess self-efficacy, which contributes to their belief in their own ability to handle the ever-changing nature of any situation. This causes the students to be willingly committed to their search for ideas and information in order to attain the most suitable solutions (Martin, & Rubin, 1995).

Implications

The research results contain both theoretical and practical implications. Firstly, the results indicate that the students' demonstrated IB corresponds with that of social cognitive theory (Bandura, 1999), which proposes a person's behavior as a result of interactions between the person and environmental factors. This finding provides empirical support for the application of social cognitive theory to better understand on the students' demonstrated IB and contributes knowledge to the literature on IB in the educational field by illustrating how LC could be influence the cognitive process and work behavior of students. Secondly, the findings from this study have important implications for lecturers who would like to develop an effective LC for encouraging students' IB. These lecturers should play the role of a facilitator in the classroom to keep students enthused and interested in lessons, give suggestions, and feedback during the learning process, and assign tasks in which the students can utilize their knowledge to solve a problem. Finally, higher education institutes could use the research results as a framework to design curricula, particularly for subjects with a primary focus on innovation development, and skill training sessions for instructors to become facilitator. These implications will help higher education institutions produce graduates who are able to demonstrate IB, which is one of the important qualities needed by various organizations (Scott & Bruce, 1994; Shanker et al., 2017).

Limitations and Future Studies

Although this study contributes to the growing literature on IB, the findings should be viewed with caution and there are several limitations that should be acknowledged. First, the study is cross-sectional in nature. There has not been a study conducted using experimental design and longitudinal data. Therefore, the results obtained will not be conclusive regarding causality. Secondly, the samples in the quantitative phase were collected from one Thai university, which cannot entirely represent the overall situation in Thailand. To improve the generalizability, studies could be replicated in other universities and countries in the region. In addition, the ratio of male to female participants in the qualitative phase was approximately 1 to 15, so the obtained data could be regarded as gender biased.

Thirdly, LC is often defined differently according to each study's objective. This research developed an LC scale based on a concept outlined by Sangsuk (2014), which focused on a Thai higher education context. The use of the research result to further study and enhance LC in other contexts can have certain limitations. In addition, in order for higher education institutes or organizations to be able to make the best use out of this study, the future studies should utilize the data from this research as the foundation in the design of training programs to encourage the development of IB.

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Ethical Considerations

The research was approved by Srinakarinwirot University's Board of Ethics. The project number is SWUEC-057/2562E. The participants signed a research consent form before participating in the process.

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