

Investigating Learner Affective Performance in Web-based Learning by using Entrepreneurship as a Metaphor

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ABSTRACT

In the era of the Internet, factors which influence effective learning in a Web-based learning environment are well worth exploring. In addition to knowledge acquisition and skills training, affect is also an important factor, since successful learning requires excellent affective performance. Thus this study focuses on learners' affective performance in Web-based learning. An initial description of the personality traits relating to entrepreneurship and Web-based learning was formulated and then examined with a Delphi survey. The findings show that certain personality traits relating to entrepreneurship are also associated with successful learning in Web-based learning. This study identified four dimensions and ten components which together constitute the metaphor of entrepreneurship in Web-based learning.

Keywords

Web-based learning, Affective performance, Entrepreneurship, Delphi survey

Introduction

As the Internet is already widely used in education, learners have many opportunities to engage in Web-based learning (Engelbrecht, 2005). Over the past decades, researchers have studied such learner characteristics as preferences, perceptions, beliefs, attitudes and self-efficacy in relation to information technology and Web-based learning (Liaw, Chang, Hung, & Huang, 2006; Yang & Tsai, 2008). One of the important challenges of the Web-based learning process is arousing learner motivation (Bento & Schuster, 2003). While most discussions have focused on how to improve online learner's knowledge and skills (e.g., Sendag & Ferhan, 2009), the importance of affective dimension is gradually receiving more attentions (e.g., Wang & Reeves, 2006; Shen, Wang, & Shen, 2009).

The actual presentation of the affective dimension in learning is the spirit. Barsade, Brief, and Spataro (2003) contemplate affect as a trait which is a stable and long-lasting tendency. If there is a spiritual metaphor for learners to emulate, which indicates the affective contents in the web-based learning environment, there would be a positive effect for the development in online learning, as what Bangert-Drowns & Pyke (2001) mentioned, truly engaged learners are behaviourally, intellectually, and "emotionally" involved in their learning tasks. According to Erkkilä (2000), in addition to its common application to commercial activity, the term of the entrepreneurship can also be applied to personality traits. That is, by taking "entrepreneurship" as a spiritual metaphor, making this term as a learning model is possible in the learning process based on our consideration that a successful learner is one who 1) actively engages in and focus on the learning task, as an entrepreneur actively managing his business; 2) accumulates experience to facilitate his learning, as an entrepreneur accumulating the total capital to grow and expand his business; 3) strives for learning achievement, as an entrepreneur striving for making financial profits; 4) trains himself to be creative in one's learning process, as an entrepreneur displaying the innovative ideas while running his business; at last, 5) shares his achievements with peers, as an entrepreneur sharing the entrepreneurial achievement with the public and benefiting the society.

This entrepreneurial metaphor might provide a learning model for learners, and some of the traits might equip learners the attitude for achieving successful learning. Take the project-based learning in web-based learning for example, it requires learners investing lots of time and efforts to engage in (Krajcik, Blumenfeld, Marx, & Soloway, 1994), which easily leads learners to their abstention and distraction if lacking a positive attitude and perseverance. With the accentuation upon the entrepreneurial metaphor, an online learner must take the responsibility for success and failure in his or her learning, devoting him- or herself to make it as a successful entrepreneur. After all, Shane, Locke, and Collins (2003) have concluded that technology could be useless without a proper policy. In terms of web-

based learning, a well-designed system or activity might be useless without learners' determination and exertion in their independent learning.

Finding a suitable metaphoric term is simply a beginning, for identifying the specific and helpful traits are even more important. Compared to the traditional learning context, the change of learning style in web-based environment is mainly based on the different access to the media, the taught knowledge and learning itself are of little difference. In short, developing a future application for cultivating relevant attitudes to the spirit of entrepreneurship and constructing the specific entrepreneurship traits extracted from traditional practices could be possible at the present stage. In the traditional contexts, some individual traits and attributions in learning, such as the motivation, engagement, etc., have been supported by studies that they are highly related to the achievement in a successful learning (e.g., Lim et al., 2006; Conrad & Donaldson, 2004). Therefore, the entrepreneurial spirit generalized and composed in this study might suggest a more efficient and better learning achievement for learners in web-based learning.

Also, the core idea of this study is primarily that online students' effort as well as their management to their learning should be like entrepreneurs' engagement in managing their business. By cultivating the entrepreneurship spirit, learners can develop a positive and active approach in their learning instead of seeing learning tasks as unnecessary homework assignments or unwanted burdens. Providing a model for learners to imitate is an encouraging way to improve learner-centered approach within web-based learning (ChanLin, 2008), especially when web-based learning becomes of heavily learner-centered, emphasizing the pervasive and personal learning (Shen et al., 2009). The purpose of this study is to clarify these traits and the related web-based implications for students to emulate in the web-based learning activities.

Literature review

Entrepreneurship

In the eighteen century, French business leader Richard Cantillon 'described entrepreneurships as "undertakers" engaged in market exchanges at their own risk for the purpose of making a profit' (as cited in Roberts & Woods, 2005, p. 46). Schumpeter (1975) proposed a definition of entrepreneurship which focuses on innovative behaviour and consists of five components: developing new and innovative products; proposing new forms of organization; exploring new markets; introducing new production methods; and searching for new sources of supplies and materials. Williams (1981) indicated that entrepreneurship is an innovative process and has a high correlation with economic growth. The definition of 'entrepreneurship', however, has developed over time. Timmons (1994) proposed that entrepreneurship centres on creating things of value, a process of making or gaining opportunities, and then developing them. He also proposed that entrepreneurship is a model for thinking, deducing, and acting. Moreover, entrepreneurship is becoming an important part of political and educational programs in many countries around the world (Faltin, 2001).

Carland, Hoy, Boulton, and Carland (1984) identified a large number of entrepreneurial trait characteristics, including: risk tolerance, independence, innovation, sense of responsibility, need for achievement, aspiration, self-confidence, strong interpersonal relationships, communicative competence, strong judgment of risks, aggression, motivation, a need for power, self-management, creativity, zealously, ambition, positive reaction to failure, and a willingness to accept challenge.

The trait characteristics identified by Gibb's (1990) seminal work as being closely related to entrepreneurship include: initiative, strong persuasive powers, moderation, flexibility, creativity, independence, problem-solving ability, a need for achievement, imagination, a strong belief that one controls one's own destiny, leadership skills, and hard work. More recently, Ward (2005) found the following personality traits to be closely associated with entrepreneurs: risk tolerance, tolerance for uncertainty, vision, capacity to inspire, creativity and innovation, a high internal locus of control, emotional stability, resilience and tenacity, self-awareness, self-confidence, high energy, achievement orientation, a proactive attitude, desire for autonomy, flexibility, initiative, assertiveness, and commitment to others.

Web-based learning and the entrepreneurial spirit in Web-based learning

To cultivate learning competence and apply their knowledge to modern society, students have to construct knowledge and develop skills through the “learning by doing” and “thinking in action” approach, an ideal that is receiving more attention since the advent of Web-based learning. Web-based learning encompasses a variety of approaches and models, each of which requires learners invest considerable amounts of time and effort. For instance, the progressive learning project with a final target, a constructivism-oriented learning method, provides learners with a complicated and authentic project in order to teach such skills as designing, planning, data collection, problem solving, decision making, perseverance, and presentation of results.

Web-based learning is a long-term learning process whose outcome largely depends on the degree to which the learner possesses and applies the trait characteristics of a successful entrepreneur. Taking Gibb’s (1990) ‘hard work’ and Ward’s (2005) ‘achievement orientation’ as examples, Web-based learners have to dedicate themselves to their project and expect to succeed, just like an entrepreneur does when initiating a business venture.

As mentioned above, researchers have identified many specific trait characteristics of entrepreneurs, and according to Gibb’s (1990) definition, someone who presents a majority of these trait characteristics can be called an entrepreneur. This study proposes a framework consisting of the four main dimensions used to describe the metaphorical entrepreneurship of learners in Web-based learning (shown as Figure 1). The classification and the sequence of the four dimensions in this framework are based on the Stage Model of Information Processing from information procession theory (Huitt, 2003), and such application of input-process-output structural framework in ICT teaching has been generally accepted. Above all, a core idea of ‘life cycle’ is provided to this framework, encouraging one to develop his/her spirit of entrepreneurship through a constant learning cycle of practice, application and modification. Every components included in the four dimensions are mainly derived from the descriptions of entrepreneurship connotation in literatures written by Carland et al. (1984), Gibb (1990), Foster & Lin (2003), and Ward (2005), etc., and they are identified and confirmed through expert panel of Delphi technique in this study.

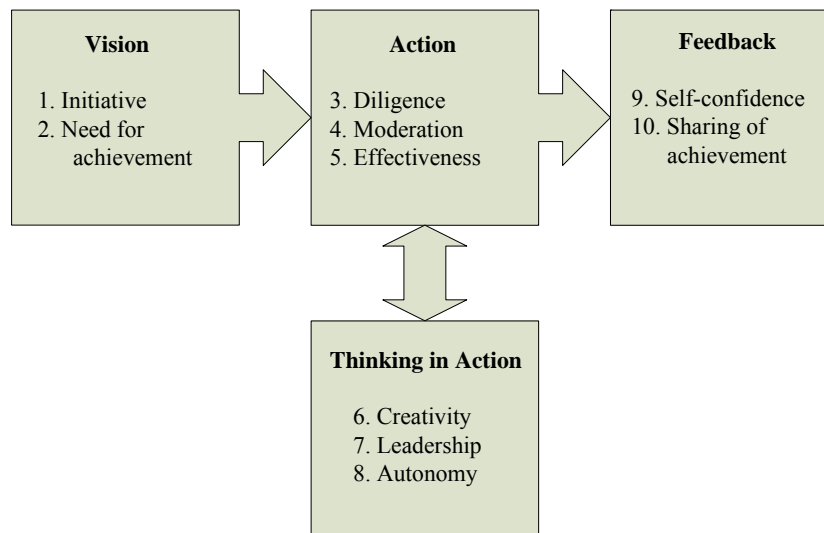


Figure 1. A framework of entrepreneurship in Web-based learning

The first dimension is ‘vision’. In entrepreneurship this refers to discovering a promising business opportunity and starting an enterprise in order to gain a profit (Gibb, 1990; Ward, 2005); in Web-based learning this refers to discovering an excellent learning opportunity and taking advantage of it in order to increase one’s knowledge. A learner with vision knows what needs to be learned and why it is important. The most important component of vision is initiative, and learners with initiative are expected to have a considerable pioneering and unique vision seeking a learning opportunity and learning from it. With an active attitude, learners must have ambition for success, and possess a high need for achievement (Hornaday & Aboud, 1971; Gibb, 1990). That is to say, after choosing a certain

goal, learners need to have a strong desire for achievement; this is what Ward (2005) called 'achievement orientation'.

The second dimension is 'action'. In entrepreneurship this refers to work diligently, moderately and effectively, while in Web-based learning it means to learn diligently, moderately and effectively. After clear understanding of the learning task, learners not only have to make appropriate and focused strategies, but also should be able to complete their learning tasks in each stage of web-based learning activity by following the prescribed order. They need to spend time in practice and exercise moderation in their learning endeavours. In addition, "action" and the following dimension "thinking in action" described below are intertwined and mingled with each other.

In the third dimension "Thinking in Action," one's working and short-term memory which promotes one's self-examination and work review is identified in 'thinking.' In other words, this 'thinking' leads one to be of a dynamic state not only in action but also in thinking. There are three components in this dimension. The first is creativity. According to a report on creativity and cultural education by the National Advisory Committee, creativity includes imagination, goal orientation, and originality. It also contains the meaning of fluency, flexibility, originality, and elaboration as well (Guilford, 1977; Torrance, 1974; Gibb, 1990). All of which are necessary if learners in an E-learning environment are to produce creative and valuable results. In ordinary learning process, to maintain the fluency and flexibility of concept development and induction, one needs abundant ideas and imagination to solve pending problems in work. Learners should find creative ways to solve difficulties and make their learning process much more fluent. The second component is leadership. It means possessing strong communication skills. Learners with leadership interact well with peers, encourage others to engage in cooperative learning, and know how to persuade them to accept good ideas about a new idea. All of which facilitate the kind of peer interactions which result in highly effective teamwork (Gibb, 1990) and successful learning. This also entails possessing a strong belief that one controls one's own destiny (Gibb, 1990), independence, and autonomy (Hornaday & Aboud, 1971; Gibb, 1990; Ward, 2005). The third component is autonomy, which refers to one's good self-management (Timmons, 1978; Welsh & White, 1981). In entrepreneurship, this means one can work in a self-regulated way. Time management, using immediate feed back to modify working methods, and immediate solutions on problems are all included. In web-based learning, self-managed learning is a process in which the learner is responsible for identifying what is to be learned. The learner is responsible for evaluating the effectiveness of the learning activity and whether it is relevant to the objective (Guglielmino & Guglielmino, 2001).

The fourth dimension is 'feedback'. In entrepreneurship this refers to evaluating self-achievements in a positive way, promoting public welfare, donating money, giving speeches, and other ways of benefitting society; in Web-based learning, this refers to evaluating achievements, presenting learning results, sharing one's experience, and giving feedback to peers. These contributions of 'feedback' are especially highlighted in effective virtual learning community, for they are not only of indispensable for students in the age of the internet (Palloff & Pratt, 1999, 2003) but also of potential for cultivating one who is likely to make contribution to the society. After completing the learning tasks and achieving the learning goals, learners should confidently take stock of their achievements and experiences, and also share these with others.

Methodology

The Delphi technique uses a series of questionnaires to collect data from a panel of selected subjects and is well suited for consensus-building (Dalkey, 1969; Linstone & Turoff, 1975; Martino, 1983; Young & Jamieson, 2001). In this study we used the Delphi technique to collect opinions from experts to form a consensus on using entrepreneurship as a metaphor for Web-based learning.

The first step consisted of conducting a literature review in which related data was collected and analyzed in order to determine the trait characteristics of entrepreneurship that have a bearing on Web-based learning. In the second step, a panel was formed to discuss and determine the preliminary elements, and the experts were asked to express their degree of agreement on the four dimensions of entrepreneurship in Web-based learning, as shown in Table 1. In the third step, the qualitative and quantitative methods were used to integrate the opinions of twelve experts to form a consensus on the trait characteristics of entrepreneurship that have a bearing on Web-based learning.

Table 1. Preliminary elements of entrepreneurship in Web-based learning

Dimensions		Entrepreneurship in Web-based learning
Vision	1. Initiative	1-1 Comprehension of the learning goal
		1-2 Clear sense of purpose
		1-3 Proactive thought and action
		1-4 Willingness to undertake new endeavours
	2. Need for achievement	2-1 Strong motivation and ambition
		2-2 Self-confidence
2-3 High expectations for learning		
Action	3. Diligence	3-1 Endeavouring to finish each learning task
		3-2 Investing time in learning tasks
		3-3 Ability to achieve concrete results
	4. Moderation	4-1 Making appropriate decisions about learning tasks after deliberating
		4-2 Completing learning tasks step by step
	5. Effectiveness	5-1 Problem solving ability
		5-2 Learning effectively
		5-3 Adopting appropriate learning strategies
Thinking in Action	6. Autonomy	6-1 Finding problems and asking questions
		6-2 Time management
		6-3 Learning automatically
		6-4 Learning accountability
	7. Creativity	7-1 Fluency
		7-2 Originality
		7-3 Flexibility
		7-4 Expressive ability
	8. Leadership	8-1 Strong interpersonal skills with peers
		8-2 Strong leadership skills in cooperative learning
		8-3 Ability to persuade peers to accept good ideas
	Feedback	9. Self-confidence
9-2 High self-evaluation of working results		
9-3 Confidence to enhance outcomes through introspection		
10. Sharing of achievements		10-1 Ability to share learning experience with peers
		10-2 Ability to present learning results through the internet
		10-3 Ability to enhance outcomes through introspection

The twelve experts of Delphi panel have experiences of promoting web-based learning education and research more than a decade, including eight professors who majored in learning technology and lecturing at universities and four teachers with extensive Web-based teaching experience serving or had been serving in-field in primary schools and junior high schools as information education leader and manager of web-based learning design and promotion.

In each iteration of the Delphi technique, the panel of experts responded to a questionnaire that included the quantitative values of mean, standard deviation, medium, mode and number of respondents. They were also presented with qualitative descriptions of their persistent and unique opinions in the previous round and asked to revise their judgments or to specify the reasons for remaining outside the consensus.

We used the method proposed by Scheibe, Skutsch, and Schofer (1975) to judge whether or not the opinions of the experts had reached stability. Specifically, a change of 15% was taken to represent a state of equilibrium; hence, any two questionnaires that had marginal changes of less than 15% were considered to have reached stability, resulting in the conclusion of the Delphi technique. We executed a total of three iterations of the Delphi technique to reach the final consensus. According to previous studies (e.g. Brooks, 1979; Custer, Scarcella, & Stewart, 1999; Ludwig, 1997), three iterations are often sufficient to collect the necessary information and reach a consensus. We have spent two months on each run of iteration, totally six months to reach a general agreement. Table 2 shows the results of the three rounds of the Delphi questionnaire. In Table 2 “—” indicates deletion of the description, for example, 1-3 and 1-4. “*” indicates the addition of an affective description which did not exist in the first round. However, the addition of the description did not guarantee that it would appear in the final affective description.

Table 2. Statistical results of three rounds of the Delphi questionnaire

Criteria		Items	First round			Second round			Third round		
			Mean	Standard deviation	Quartile deviation	Mean	Standard deviation	Quartile deviation	Mean	Standard deviation	Quartile deviation
Vision	1-1	4.2	0.8	0.5	4.3	0.4	0.1	4.3	0.4	0.1	
	1-2	3.8	1.0	0.3	4.1	0.6	0.1	4.3	0.4	0.1	
	1-3	3.5	1.0	0.5	3.6	0.9	0.5	3.8	0.8	0.5	
	*1-4	—	—	—	3.5	1.0	0.6	—	—	—	
	2-1	4.3	0.6	0.5	4.3	0.5	0.5	4.4	0.5	0.5	
	2-2	3.9	1.0	0.6	4.2	0.8	0.5	—	—	—	
	2-2	4.2	0.7	0.5	4.2	0.8	0.5	4.3	0.6	0.5	
Action	3-1	4.4	0.5	0.5	4.3	0.4	0.1	4.3	0.4	0.1	
	3-2	3.5	1.3	1.5	4.2	0.9	0.5	4.5	0.5	0.5	
	* 3-3	—	—	—	2.8	1.1	1.0	3.8	0.4	0.1	
	4-1	3.3	0.6	0.5	3.7	0.7	0.5	4.0	0.4	0.0	
	4-2	4.1	0.6	0.1	4.3	0.4	0.1	4.3	0.5	0.5	
	5-1	4.0	0.8	0.1	3.7	1.1	0.1	4.3	0.4	0.1	
	5-2	3.9	0.8	0.0	3.7	0.7	0.5	4.0	0.4	0.0	
5-3	3.8	0.8	0.1	4.1	0.8	0.1	4.3	0.4	0.1		
Thinking in action	6-1	4.3	0.6	0.5	4.2	0.7	0.5	4.3	0.6	0.5	
	6-2	4.3	0.8	0.5	4.5	0.5	0.5	4.6	0.5	0.5	
	6-3	4.3	0.8	0.5	4.3	0.8	0.5	4.5	0.5	0.5	
	6-4	4.1	0.9	0.5	4.3	0.9	0.5	4.5	0.6	0.5	
	7-1	3.8	1.0	0.6	4.0	0.8	0.1	4.1	0.5	0.0	
	7-2	3.7	1.0	0.6	3.9	0.9	0.3	4.0	0.6	0.0	
	7-3	3.3	0.9	0.6	4.0	0.6	0.0	4.0	0.6	0.0	
	7-4	3.3	0.7	0.5	3.9	0.8	0.0	4.0	0.4	0.0	
	8-1	4.0	1.1	0.6	4.2	0.9	0.5	4.5	0.5	0.5	
	8-2	3.7	1.1	0.8	3.9	0.8	0.0	4.1	0.5	0.0	
8-3	3.6	0.9	0.5	3.7	0.6	0.1	4.0	0.4	0.0		
Feedback	9-1	4.2	0.8	0.5	3.8	0.7	0.0	4.1	0.5	0.0	
	9-2	4.1	0.8	0.1	4.1	0.8	0.1	4.2	0.6	0.1	
	*9-3	—	—	—	4.1	0.6	0.1	4.2	0.6	0.1	
	10-1	4.1	0.8	0.6	4.3	0.6	0.5	4.4	0.5	0.5	
	10-2	3.8	0.9	0.6	4.1	0.5	0.0	4.2	0.4	0.0	
	*10-3	—	—	—	3.9	0.8	0.6	4.1	0.5	0.0	

Results and discussion

The four dimensions containing the ten components of affective competence were divided into twenty-eight concrete elements of entrepreneurship in Web-based learning. While the number of components remained the same before and after the Delphi survey, some modifications were made to the number of concrete elements. Specifically, the number of elements in the vision dimension decreased, and the number of elements in the action dimension increased. The number of elements in the “thinking in action” and “feedback” dimensions remained the same. Table 3 maps the relationship between entrepreneurship in business and the metaphorical entrepreneurship of Web-based learning.

Table 3. Entrepreneurship in business and metaphorical entrepreneurship in Web-based learning

Dimension		Entrepreneurship in business	Metaphorical entrepreneurship in Web-based learning
Vision	1. Initiative	Possessing visions and able to see the future business goal	Possessing clear comprehension to the learning goal
		Showing strong enthusiasm in work	Showing strong enthusiasm in

Dimension		Entrepreneurship in business	Metaphorical entrepreneurship in Web-based learning
	2. Need for achievement	Strong motivation and ambition to the success	learning
		High expectations for profit	Strong motivation and ambition to complete the learning task successfully
Action	3. Diligence	Endeavouring to accomplish business tasks	High expectations for learning outcomes
		Investing time in business tasks	Endeavouring to accomplish learning tasks
	4. Moderation	Making appropriate decisions about business tasks after deliberating	Investing time in learning tasks
		Able to complete business tasks by following the prescribed order	Making appropriate decisions about learning tasks after deliberating
	5. Effectiveness	Able to proffering practical thoughts and methods to complete the business tasks with a clear understanding of the task	Able to complete learning tasks in each stage of web-based learning activity by following the prescribed order
		Working efficiently	Able to proffering practical thoughts and methods to complete learning tasks with a clear understanding to the task
Taking focused working strategies		Learning efficiently	
Thinking in Action	6. Autonomy	Finding problems and resolving them right away	Taking focused learning strategies
		Using time management to control work time	Finding problems and asking questions right away
		Using feedback as an inspection for the performance review of the business	Using time management to control learning time
		Modifying working methods based on business results	Using feedback as an inspection for the performance review of Web-based learning process
	7. Creativity	Fluency of concept development, reflection and induction in business management	Revising learning methods and strategies based on learning results
		Originality in business management	Fluency of concept development, reflection and induction in the learning process
		Diversification toward working ideas and methods and flexibility to solve businesses problems	Originality in the learning outcomes
		Elaborate and careful thinking in business management	Diversification toward learning ideas and methods and flexibility to solve learning difficulties
	8. Leadership	Maintain good relationships with co-workers and business associates with strong interpersonal skills	Elaborate and careful thinking in the learning process
		Knowing how to lead or to direct others to work together while proceeding business cooperation	Encouraging others to think in the process of peers interaction
		Ability to persuade co-workers or business associates to accept good ideas on working task	Knowing how to lead or direct others to engage in learning and profound discussion while proceeding peer learning
	Feedback	9. Self-confidence	Positive self-evaluation of working attitude of one's own
Positive self-evaluation of business results			Positive self-evaluation of attitude towards learning process of one's own
		Positive self-evaluation of learning results	

Dimension		Entrepreneurship in business	Metaphorical entrepreneurship in Web-based learning
		Able to enhance work product and performance through introspection	Able to enhance learning efficacy and modify learning process through introspection
	10. Sharing of achievements	Able to share working experience with others in course or at forum.	Able to share learning experience with peers in web-based learning environment
		Sharing business achievements to society through philanthropy	Able to present learning results through the internet
		Able to do timely exchange of opinions with co-workers and business associates	Able to offer suggestions to peers in a timely manner and accepting peer feedback

Table 3 shows that entrepreneurship is an appropriate metaphor for Web-based learning. As indicated by the first dimension, vision, effective learners comprehend the learning goal, actively engage in learning, and expect positive results, which can be regarded as having a sense of self-efficacy in education. Self-efficacy is a judgment a person has about himself concerning his ability to deal with an intellectual, social, affective or physical situation (Bandura, 1977). Self-efficacy theory posits a strong connection between beliefs and engagement, so that people with a strong sense of self-efficacy are likely to persist and succeed (Bandura, 1982). Many researchers have suggested that a student's sense of self-efficacy is a good predictor of academic achievement and motivation (Graham & Weiner, 1996; Pajares, 2003; Pintrich & DeGroot, 1990; Pintrich & Schunk, 1995). The strong relationship between expectations and academic achievement has been well established both theoretically and empirically (Johnson, Livingston, Schwartz, & Slate, 2000; Marzano, 2003).

As indicated by the second dimension, action, successful learners dedicate themselves to their learning tasks. This process is highlighted by the fundamental idea underlying engagement theory: students must be meaningfully engaged in learning activities through interaction with others and meaningful tasks. In principle, such engagement could occur without the use of technology (Kearsley & Shneiderman, 1999). Yet, the essential characteristics of the Internet include communication, immediate feedback, and automatic assessment, all of which facilitate learner engagement and performance.

The third dimension, thinking in action, stresses the development of the learner's thinking skills, including autonomy, creativity and leadership. The denotation of self-regulated learning exhibits learners' autonomy. Self-regulated learners continually engage in four activities: planning, organizing, monitoring, and evaluating the learning process (Corno, 1989; Zimmerman & Paulsen, 1995). Being self-regulated entails using all the skills that enable one to meta-cognitively, motivationally, and behaviourally participate in one's own learning process (Zimmerman, 1986). Self-regulated learners tend to exhibit goal directedness, manage their learning time, meaningfully engage in learning practice, use cognitive and meta-cognitive strategies appropriately, and have a sense self-efficacy regarding their learning tasks. Since thinking directs a learner's behaviour, learners must hone their thinking skills in order to better direct their learning efforts and attain their learning goals. On the other hand, creativity brings valuable benefits to learners and classrooms even in different educational subjects (e.g., Kaufman & Sternberg, 2007; Piggott, 2007), and the ability to persuade and lead peers also facilitates learners to have successful learning.

As indicated by the fourth dimension, feedback, the purpose of education is pursuing academic achievement and eventually serving society. On the whole, in the process of Web-based learning, learners cultivate the spirit of entrepreneurship. Accordingly, Web-based learning activities should be designed so as to cultivate the personality traits of an entrepreneur in the learner, and also facilitate self-accountability.

Using the traits of entrepreneurship as a metaphor for learning, the two most significant contributions are the following: (1) to provide a concrete prototype for learners, which is related to the existing issues of learning technology. Although this idea is certainly not new, it is a natural conclusion to this study; (2) to utilize the entrepreneurship spirit, in this era of knowledge economy, as a model for the learners' attitudes toward learning. To quote a well-known aphorism, "Attitude determines altitude." After all, EQ (Emotional Intelligence) and SQ (Social Intelligence) which have been more often ignored by educator should have played vital and necessary roles as IQ (Intelligence Quotient) in the learning process.

We extract the essence of the traditional learning traits that can be transformed into the metaphoric entrepreneurship traits in web-based environment. In the current situation, however, we don't expect a website being provided with such a quality of cultivating learner's spirit of entrepreneurship, entirely or partially, for the nature of the learning traits cultivation is usually non-formal and/or hidden. With the consideration of 'how to achieve most of components we found through tools/pedagogy of Web-based learning', we expect this study calling the attention to the practice of entrepreneurship cultivation. Moreover, with a long term perspective, developing rules and rubrics for web-based learning environment in the near future would be capable of being expected as well. As applying the entrepreneurship traits into online project-based learning practically, for example, by connecting the statements of the two dimensions, vision and feedback to encourage learners to conceive and promise the efficacy of learning outcomes and its specific influence upon other learners, or postpone the project schedule and increase the challenge of learning in order to encourage learners to develop a positive attitude toward Web-based learning.

This study starts with the interpretation by the metaphoric entrepreneurship, and investigates learner's affective attitude in learning. As table 3, we make use of the idea of entrepreneurship borrowed from business management and bring it to the issue of "Metaphorical entrepreneurship in Web based learning." Indeed, the components in online context generalized by this research are included in those of traditional context; however, it is reasonable for the boundary of the real world and the virtual world has become blurred. Given that the Internet application is usually personal and private from user's point of view, we suggest learners should face various online learning more with consistent affective attitude which is often neglected and marginalised. "It is time to redress the imbalance by developing theories and technologies in which affect and cognition are appropriately integrated with one another" (Picard, Strohecker, Papert, Bender, Blumberg, & Breazeal, 2004). Meanwhile, through emphasizing the importance of affective domain to web-based learning by presenting experts' definition and perspectives through Delphi technique, the process of this research could be more significant than the result.

Conclusion and suggestions

With the progress and extensive application of Internet technology, Web-based learning has rapidly developed into an effective educational method. Some scholars have expressed concern that Internet education fails to nurture essential positive personality traits (Bayram, Deniz, & Erdoğan, 2008). This study identifies a number of positive trait characteristics held in common by entrepreneurship and Web-based learning, indicating the cultivation of learner affect in a Web-based learning environment. Entrepreneurship could be a likely metaphor for Web-based learning. Online learners are supposed to be as successful entrepreneurs placing emphasis on the "activeness" of "management" in the four dimensions of learning process. Only online learners with such attitude can be called a successful learner. As entrepreneurs, "who looks upon a business as though it is his own," (Chang, 2009) they possess the spirit of entrepreneurship and consider the web-based learning tasks as their own enterprise.

Although the components proposed by this study have no specific or direct evidence to support that all the attributes do relate to learning performance, any identified traits in the four dimensions are almost recognized by the teaching and learning field and supported by the related educational literature, and the direct contribution of this study at the current stage is to arouse the attention to embed these components in web-based learning, emphasizing that the spirit of entrepreneurship should be cultivated among web-based learners. Although these traits could also be found in the traditional context for achieving high quality learning outcomes, we expect that the basic metaphor application (suggested as the right column in Table 3) expanded and infused into the network practices in the future, carrying out its actual significance for the web-based learners in their effective performance.

To sum up, Web-based education must include more than knowledge acquisition and skill training; it must also cultivate the learner's personality and overall maturity. Though web-based and e-learning has been widely used as a common way for learning; however, we regard that the learner's sense of responsibility for learning is even more essential than any other learning style, and must beyond the technology of the internet and the digitalized information. The entrepreneurship mentioned in this study seems to be more important for its inclusion of the traits highly related to online learning, and this spirit is highly corresponded with the learner-centered idea. Beside the rare investigation on learners' effective attitudes in web-based learning, we expect that there would be more research and teaching methods make effort to the possible affective attitudes for online learning rather than the theoretical pursuit for knowledge.

For future study suggestions, there are several directions: 1) after we use the entrepreneurial metaphor that could contribute to a successful online learning, the further researches that are likely to prove the concept of the spirit of entrepreneurship could further penetrate into the efficacy and practicability that these traits indeed are effective to learner's achievement in web-based learning. 2) According to the foregoing specific traits, the expanded web-based activities integrating with the entrepreneurial spirit could be designed to launch a real class. We expect, in addition to the highlight on knowledge acquisition and the skill learning, that there are more designs of web-based activities which help to cultivate the affective traits more.

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