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From a Perspective on Foreign Language Learning Anxiety to Design an Affective Tutoring System

Ching-JuCHAO[ab*], Hao-Chiang KoongLIN[a]
[a]*Dept. of Information and Learning Technology, National University of Tainan, Taiwan*
[b]*Dept. of Applied Foreign Languages, Tung Fang Design Institute, Taiwan*
*chingju@mail.tf.edu.tw

Abstract: According to Krashen's affective filter hypothesis, students who are highly motivated have a strong sense of self, enter a learning context with a low level of anxiety, and are much more likely to become successful language acquirers than those who do not. Affective factors, such as motivation, attitude, and anxiety, have a direct impact on foreign language acquisition. Horwitz et al. (1986) mentioned that many language learners feel anxious when learning foreign languages. Thus, this study recruits 100 college students to fill out the Foreign Language Classroom Anxiety Scale (FLCAS) to investigate language learning anxiety. Then, this study designs and develops an affective tutoring system (ATS) to conduct an empirical study. The study aims to improve students' learning interest by recognizing their emotional states during their learning processes and provide adequate feedback. It is expected to enhance learners' motivation and interest via affective instructional design and then improve their learning performance.

Keywords: Foreign Language Learning Anxiety, Affective Filter Hypothesis, Affective Tutoring System, Japanese Learning

1. Introduction

The learning process of learning a second language is not always smooth and successful for many people. In recent years, the study of second language acquisition towards exploring learner's personality factors has been a trend, in addition to the language acquisition process and teaching methods. Chaudron, C.(2001) analyzed studies published in *The Modern Language Journal*, between 1916 and 2000. He referred to the 1980s as a period of learner-centered learning and mentioned an increasing trend towards research into the relevance of learners' psychology. In the past, language acquisition research focused on the study of what characteristics are possessed by successful language learners. Learning outcomes of the same teaching methods would not be the same for all learners in the same learning context; thus, personality factors should be incorporated into second language acquisition theories. Brown (2006) also stated that understanding how people feel, respond, and evaluate is a very essential part of second language acquisition theories.

Horwitz, Horwitz, and Cope (1986) mentioned that many learners feel anxious when learning foreign languages. In Krashen (1988) Affective Filter Hypothesis, the affective filter is likened to an invisible wall which exists between learners and languages. Factors, such as negative attitudes and insufficient learning motivation or enthusiasm, form a filter which hinders learner's message reception and comprehension, and then affects outcomes of second language learning. In other words, when learners feel bored, tired, nervous, or anxious or have no energy, they screen out learning content and then cannot fully learn materials which have been taught. According to this hypothesis, learner's mood and attitude determine the quality of learning.

Learning efficiency would be reduced when fear, anxiety, and other negative emotions appear, whereas positive emotions enhance learning outcomes.

Therefore, this study recruits 100 college students who are Japanese language learners to fill out the Foreign Language Classroom Anxiety Scale (FLCAS) and uses an Affective Tutoring System (ATS) in which the participants are allowed to learn Japanese language in a less stressful context which can enhance their motivation and improve their learning outcomes. The ATS can identify learners' emotions, select appropriate lessons for the learners based on their abilities, offer appropriate learning strategies, and provide affective feedback. The aforementioned characteristics of the ATS can reinforce learners' positive emotions, improve negative moods, and then enhance motivation which would promote learning effectiveness and help students recognize their achievements.

2. Literature Review

Affective Factors in Second Language Acquisition (SLA)

Arnold (1999:8) mentioned that "anxiety is quite possibly the affective factor that most pervasively obstructs the learning process. It is associated with negative feelings such as uneasiness, frustration, self-doubt, apprehension and tension." Mori and Mori (2011) indicated that research on individual differences in second language acquisition (SLA) confirms that some non-linguistic factors can explain why some second language learners are more successful than others. These individuals' differences may come from affective factors, including motivation, anxiety, attitudes, and learner perceptions. Many affective studies examined different strategies employed by learners with various goals, feelings, attitudes, and perceptions when they encounter the same task and investigated how these approaches affect the levels of success in language learning. Mori and Mori (2011) believed that the two aspects in the study of affective factors are to examine the relationship between the known variables and learning behaviors using large scale quantitative data and to carry out a more in-depth study of individual learners.

Brown (2006) mentioned that personal factors include language learning strategies, learning styles, affection, self-confidence, beliefs, motivation, ages, and socio-cultural factors. Personal factors,which also have direct impacts on learning effectiveness, are often very complicated and interrelated. When given the same lessons in the same learning environment, learners' results vary. High achievers are capable of finding and using strategies without being specifically instructed. However, low achievers who lack motivation would need more guidance.

Oxford (1990) also believed that the influence of affective factors in language learning is very important. Affective factors include emotions, attitudes, motivations, and values. Language learners can use affective strategies to control these factors. The affective strategies proposed by Oxford (1990) stabilize learners' emotions, including lowering anxiety, self-encouragement, and taking one's emotional temperature. Good language learners are usually those who know how to control their learning emotions and attitudes (Naiman et al, 1975). However, Chamot et al. (1987) stated that not many studies have examined the frequency of using affective strategies, and approximately 1of20 learners employs affective strategies.

Affective filter hypothesis

One of the five hypotheses (Krashen, 1987) concerning second language acquisition is the “affective filter”, which acts like an invisible wall between learners and input, interfering with and limiting the delivery of language input. For example, those students who lack motivation are likely to pay less attention to the input; their filter level is high, so less input can reach them. On the other hand, highly motivated learners concentrate on the language input which penetrates their language acquisition device as a result. Thus, according to Krashen’s(1987) hypothesis, passive attitudes and lack of motivation and enthusiasm in learning are regarded as a filter which impedes learners’ response to language input and thus affects the learning effectiveness. When learners are bored, nervous, and stressed or lack motivation, their screen will be raised which would result in the incapability to process learning content. Learners’ feelings and attitudes are critical factors in the quality of learning. When negative feelings, such as fear and shyness, are at a low level, learning efficiency increases and vice versa.

The affective filter hypothesis states that affective factors influence second language learning, especially the speed of learning, not the path and direction. Krashen(1987) believed that the affective filter increases after learner’s puberty. Adults have more self-consciousness and different emotions which lead to differences in second language learning and first language acquisition. So the process of language acquisition is not related to age differences; adults who have less success in language learning mostly are due to affective factors and not their ages.

Research in Foreign Language Anxiety

The lack of a reliable and effective method to evaluate learners' foreign language learning anxiety; therefore, research on relationships between learning anxiety and foreign language learning has not been extensively studied (Scovel, 1978; Horwitz et al., 1986).With this view of language anxiety, Horwitz et al. (1986) developed the Foreign Language Classroom Anxiety Scale (FLCAS) as a 33-item instrument scored based on a 5-point Likert-type scale, from "strongly agree" to "strongly disagree." This instrument was used to measure foreign language learners’ anxiety level while learning a language in a classroom. The higher the score is, the higher the anxiety level would be. Horwitz (1986) performed the internal consistency reliability analysis of 108 samples, and Cronbach's Alpha coefficient reached .93.MacIntyre& Gardner (1991) stated that foreign language anxiety is a risky element which can interfere with the acquisition, retention, and language output. Moreover, Aida (1994) conducted a research on Japanese language learners according to Horwitz et al.’s (1986) three-factor model of foreign language anxiety (FLA) and obtained the internal consistency of .94, using Cronbach’s alpha coefficient. Although foreign language anxiety has been considered an important factor that affects the effectiveness of language learning, results of different studies are used to develop various factor models. Horwitz et al. (1986) proposed the foreign language classroom anxiety scale (FLCAS) which has three domains: communication apprehension, test anxiety, and fear of negative evaluation. However, Aida’s (1994) study stated that the FLCAS is a four-factor model: speech anxiety, fear of negative evaluation in the Japanese class, degree of comfort when speaking with native speakers of Japanese, and negative attitudes towards the Japanese class. In Aida’s (1994) study, six items (items 2, 6, 15, 19, 28 and 30) were removed from the final model. However, the result shows the foreign language learning anxiety is negatively correlated to students’ performance in language learning.

3. Research Method

3.1 Research Architecture

This study aims to analyze language learning anxiety of Japanese language learning and its causes from the perspectives of foreign language learning anxiety and affective filter hypothesis. This study uses the affective tutoring system in which the system agent can identify the learners' emotions by their facial expression and written words, offer feedback to reduce their anxiety level, and thus enhance learning effectiveness. This is an empirical study to evaluate and verify the usability of the proposed system and participants' learning effectiveness and then conclude that technology could enhance language learning. Figure 1 shows the research framework of this study.

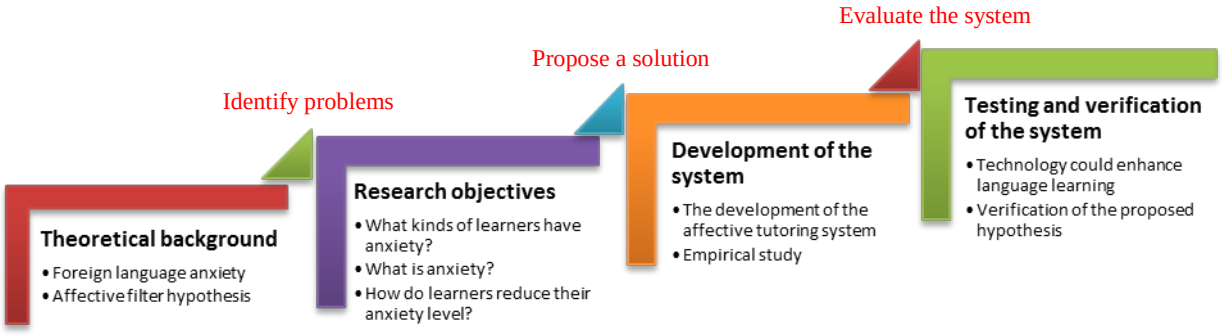

Figure 1.Framework of this study

3.2 Participants

This study uses Horwitz et al.'s (1986) Foreign language class anxiety scale (FLCAS) as an instrument to evaluate learning anxiety of the 100 college students who are Japanese language learners in Taiwan. Those participants are classified as 60 beginners and 40 nonbeginners according to their foreign language level. Sixty-four of them major in language studies, and the rest of them major in other studies. Twenty-six of them are males, and the rest of them are females. Thirteen out of the 100 participants has taken the Japanese Language Proficiency Test (JLPL), and they are all females.Thirty-five out of the 100 participants in which 19 of them with a language major and 16 of them with a non-language major participate in the empirical study and use the affective tutoring system (ATS). The details of the empirical study will be discussed in another study.

Instrument

This study uses the FLCAS as an instrument to evaluate the partcipants' learning anxiety level and uses Horwitz et al.'s (1986) three-factor model and Aida's (1994) four-factor model to analyze the collected data.

The development of the affective tutoring system (ATS) is based on Horwitz et al.'s (1986) three-factor model with consideration of communication apprehension, test anxiety, and fear of negative evaluation. The ATS-JP uses the agent to substitute a real teacher and appropriately provides the learners affective feedback, including words, pictures, voice, and curriculum adjustments, with an aim to improve the learners' test anxiety by offering repetitive practices and lowering their communication apprehension and fear of negative evaluation which may occur in a physical classroom.

In this study, the affective tutoring system (ATS) is designed to provide basic Japanese lessons. The Affective Japanese tutoring system (ATS-JP) can recognize the learners' facial expression

and emotional states and then offer them appropriate lessons with three different grades of difficulty: simple, normal, and advanced. During the course, the system monitors the learners' emotional states, gives positive feedback, and adjusts the curriculum accordingly.Figures2 and 3show the ATS-JP interfaces of simple class and normal class.

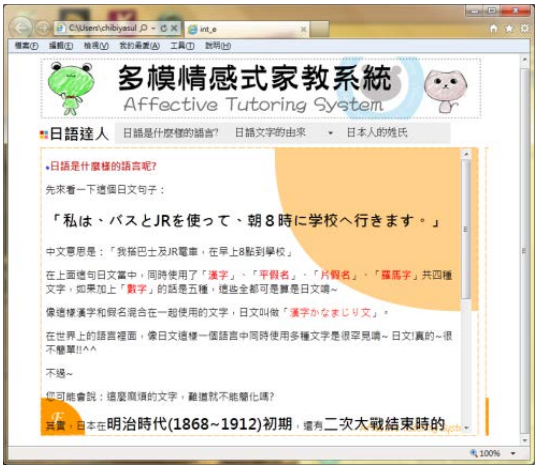

Figure 2：Simple class

Figure 3：Normal class

4. Experimental results

The FLCAS contains 33 items and employs a 5-point Likert-type scale scored on a continuum ranging from “strongly agree (5)” to “strongly disagree (1)”.Possible scores on the FLCAS range from 33 to 165 with a hypothetical mean of 99. The higher the score is, the higher the level of foreign language anxiety would be. The statistical results show that the learners who receive scores above 99 are more than half of the class (55) with an average score of 102.9. Table 1 shows the results of this study compared to Horwitz et al's (1986)and Aida's (1994) studies.

Table 1The results of this study compared to Horwitz et al.’s (1986) and Aida’s (1994) studies

	Present Study	Horwitz’s Study	Aida’s Study
Sample size	100	108	96
Foreign language	Japanese	Japanese	Spanish
Student’s FL level	Major / Beginners(24) Non- Major / Beginners(36) Major / Non-Beginners(40)	Beginners	Beginners
Score range	45-161	45-147	47-146
Mean	102.9	94.5	96.7
Standard deviation	22.4	21.4	22.1

Anxiety is classified into five levels according to Krinis (2007) (See Table 2). Tables 3 to 5 provide descriptive results of this study. The results show that 52 % of the non-major/beginners tend to have high anxiety, and 53% of the major/ non-beginners have high anxiety. The male participants (54%) have high anxiety. The 54% of the participants who haven’t taken the JLPT tend to have anxiety, and the 38% of those who have taken the JLPT have very low anxiety. The results indicate that the learners who have more confident in a target language do not tend to have anxiety.

Table 2: Level of Foreign Language Anxiety (quoted by Dr. Anna Krinis(2007))

Scores	Level of Foreign Language Anxiety	Level
33-82	Very low anxiety	1
83-89	Moderately low anxiety	2
90-98	Moderate anxiety	3
99-108	Moderately high anxiety	4
109-165	High anxiety	5

Table3: Level of Foreign Language Anxiety (Student's FL level)

Number of the participants/ percentage	Very low anxiety	Moderately low anxiety	Moderate anxiety	Moderately high anxiety	High anxiety	Total
Major/Beginners(24)	5 / 21%	4 / 17%	4 / 17%	6 / 25%	5 / 21%	24 / 100%
Non-Major/Beginners(36)	6 / 17%	2 / 6%	9 / 25%	7 / 19%	12 / 33%	36 / 100%
Major/Non-Beginners(40)	6 / 15%	2 / 5%	7 / 18%	4 / 10%	21 / **53%**	40 / 100%
Total	17 / 17%	8 / 8%	20 / 20%	17 / 17%	38 / 38%	100 / 100%

Table4: Level of Foreign Language Anxiety (Gender)

	Very low anxiety	Moderately low anxiety	Moderate anxiety	Moderately high anxiety	High anxiety	Total
Male	2 / 8%	1 / 4%	5 / 19%	4 / 15%	14 / **54%**	26 / 100%
Female	15 / 20%	7 / 9%	15 / 20%	13 / 18%	24 / 32%	74 / 100%
Total	17 / 17%	8 / 8%	20 / 20%	17 / 17%	38 / 38%	100 / 100%

Table5: Level of Foreign Language Anxiety (Experience of taking the JLPT)

	Very low anxiety	Moderately low anxiety	Moderate anxiety	Moderately high anxiety	High anxiety	Total
Haven't taken the JLPT	12 / 14%	8 / 9%	19 /22%	15 / 17%	33 / 38%	87 / 100%
Have taken the JLPT	5 / **38%**	0 / 0%	1 / 8%	2 / 15%	5 / 38%	13 / 100%
Total	17 / 17%	8 / 8%	20 / 20%	17 / 17%	38 / 38%	100 / 100%

Tables 6 and 7 show the results of this study which are analyzed based on Horwite et al's (1986) and Aida's (1994) factor models. The mean value (3.36) of communication apprehension indicates the main source of language anxiety, and the mean value (3.52) of comfortableness with Japanese indicates that the participants tend to have more anxiety in the context of talking with native Japanese speakers.

Table6: The results analyzed based on Horwitzet al.'s (1986) factor model

Horwitz'sfactor model	Communication Apprehension	Test Anxiety	Fear of Negative Evaluation
Major/Beginners(24)	2.95	2.82	2.85
Non-Major/Beginners(36)	3.31	3.12	3.26
Major/Non-Beginners(40)	**3.36**	3.02	3.23
Average	3.24	3.01	3.11

Table7: The results analyzed based on Aida's(1994) factor model

Aida's factor model	Speech Anxiety	Fear of Failing	Comfortableness with Japanese	Negative attitude
Major/Beginners(24)	2.85	3.05	3.15	2.6
Non-Major/Beginners(36)	3.23	3.00	3.22	2.68
Major/Non-Beginners(40)	3.26	3.19	**3.52**	2.74
Average	3.15	3.09	3.32	2.69

Figure 4 shows photos of the experimental process. There are 35 participants who use the ATS and complete the pretest, posttest, the system usability scale and then learning motivation scale. The participants' feedback indicates that the ATS has high usability. The results of the pretest, posttest, and the learning motivation scale indicate that the ATS is beneficial for the Japanese language learning, reducing learning anxiety, and improving learning effectiveness effectively.

Figure 4 Photos of the experimental process

5. Conclusions and implications

The results of this study indicate that half of the participants have language learning anxiety. However, there is no significant correlation between learning anxiety and language beginners or students with a Japanese language major, indicating that anxiety could occur in any language learning process. The male participants who account for 54 % of the participants tend to have high language learning anxiety, and 77% of the participants who have not taken the JLPT tend to have anxiety, indicating that those who have taken the JLPT would have higher self-esteem and less anxiety in learning Japanese. In addition, the results show that students tend to experience language anxiety in communication situations. The participants would have more anxiety in the context of talking with native Japanese speakers. The ATS-JP uses the agent to substitute a real teacher, detects the learners' emotions, and provides feedback appropriately, including words, pictures, voices, and curriculum adjustments, with an aim to improve the learners' test anxiety by offering repetitive practices and lowering their communication apprehension and fear of negative evaluation which may occur during learning a language in a physical classroom. Moreover, the ATS-JP provides opportunities for the learners to practice repetitively to improve test anxiety and enhance comfortableness with Japanese.

The ATS-JP is still in an experimental phase, and more emotional identification methods would be proposed to improve the recognition accuracy in the future. In addition, otheralgorithms would be adopted to improve the system's ability to recognize learners' emotional states from text input. Another goal is to integrate voice functions into the system to provide speaking practices to assist students who are shy of talking to have more practice opportunities with an aim to learn in an easy and stress-free language learning context.

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