Academic Anxiety of Vietnamese Secondary School Students as a Reason for Applying Online Learning

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Abstract: Academic anxiety is one of the major problems in student psychology across the world. It applies equally to students of all ages, from elementary school to college and university students. Research shows that learning online is an effective way to defuse feelings of academic anxiety. Elimination of anxiety is clearly visible regardless of age, gender, or prior online learning experience. The study aims to identify academic anxiety as one of the most important reasons for moving to online learning or blended learning in secondary school. The study investigated academic anxiety among secondary school students in Vietnam. After surveying 677 students in classroom learning, the results showed that 13.7% of secondary students suffered from frequent anxiety, and 3.0% of them suffered from very frequent anxiety. Lower anxiety was observed among students actively participated in-class activities, and students with excellent academic performance. These factors can be optimally enhanced through blended and online learning. There were no differences in academic anxiety among male and female students, urban and rural students. There was a moderate correlation between a student's anxiety level and pressure of the school, parental expectations, students' motivation for high performance, and especially, among students who have the melancholic temperament. And the influence of these negative factors can also be optimally reduced with the help of online learning. Regression model could provide useful suggestions for parents, teachers and students in reducing academic anxiety for students, including the use of full or blended online learning.

Keywords: Online learning, anxiety, secondary school students, parenting style, temperament, academic motivation.

INTRODUCTION

Anxiety is a negative emotional experience occurring in the expectation of danger. Anxiety can be contagious; it can occur independence of specific events. Anxiety is different from fear. Fear is an effective response to real threats; while anxiety is an anticipation of future unknown threats [1]. There are two types of anxiety: *normal anxiety* known as a feeling of fear in response to stressful situations; and *pathological anxiety* or *anxiety disorder* when prolonged and intense anxiety interferes with daily functioning or affects emotional control and physical conditions. Anxiety disorder is a harmful anxiety [2]. According to DSM-IV-TR, anxiety disorder is a state of excessive anxiety, putting individuals in difficulties and loss of control [1].

Anxiety disorder is a common mental disorder. A survey by the World Mental Health Organization in 17 countries showed that one out of twenty people suffered from an anxiety disorder - depression in the past few years [3]. The percentage of anxiety disorder among young adults aged 18 was about 20-25% [4].

Anxiety disorder could occur in people of any gender and age; however, the highest percentage of anxiety disorder fell in the age range of 15 to 44, and women were at a higher risk than men [5]. The rate of anxiety disorders in the population varies by regions: the highest rate was South America (20.6%), followed by Asia (16.7%), North America (13.4%), Europe (11.9%), Africa (11.5%), and lastly Australia with 7.3% [6].

Research shows that learning online is an effective way to defuse feelings of academic anxiety. Elimination of anxiety is clearly visible regardless of age, gender, or prior online learning experience. However, digital literacy and online experience is a determining factor in the effectiveness of reducing anxiety. Predictors of anxiety for online learners are gender, prior online experience, awareness of the implications of academic preparation, and student status at the start of studies (first year-status), studies show. Age and learning satisfaction are not determinants of anxiety in online learning [7, 8]. Research shows that it is the feeling of anxiety and its elimination that is the main factor for achieving academic results online, for learning satisfaction, for subsequent enrollment in training and student retention [7].

Adolescents were at high risk for anxiety disorder [9]. In the United States, the percentage of children

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suffering from anxiety disorders at the age of 13 to 18 was 5.9% for girls and 4.6% for boys [3]. At any time, it was estimated that one out of thirteen adolescents had suffered from anxiety disorder [3]. Van Voorhis and Blumentritt [10] claimed that about 16.9% of Mexican-American children had shown signs of anxiety disorder.

In Vietnam, large-scale studies on anxiety and anxiety disorders have been conducted on people of all age, background, gender. In 2005, a large-scale survey of 7,584 people aged 14 - 25 in 42 provinces/cities across the country implemented by the Ministry of Health [11] found that about 32.4% of them felt sad and worried about their life, in which about 25.3% of which felt very sad. Among women, 5.8% had a moderate anxiety disorder, and 4.1% had severe anxiety disorder [12]. In children and adolescents, the rate of depression varies from 6.6% [13] to 12% [14]. Anxiety was observed in 25.1% of college students [15] and 12% to 28% in high school students [16-18].

Various causes and factors affecting anxiety disorders have been pointed out. Feldman [2] generalized three main causes of anxiety disorder: biological and genetic agents; environmental agents and an individual's inaccurate perception of threats. Beck *et al*. [19] focused more on individual perception, thus pointing three different causes of anxiety disorder: Negative thoughts about oneself, about others, and about the future; false information processing; and distorted individual image. Besides, family-related factors are also a possible cause of anxiety disorder, such as domestic violence [12, 20] and parenting style [21-23]. Anxiety was higher among children experiencing overprotective and authoritarian parenting as compared to authoritative parenting style. Feeling of safety when staying with loved ones was the most important protective factor against anxiety.

Parenting style has been studied recently by many sources. Researchers have determined that parenting behaviours are often associated with multiple identifiable stereotypes that lead to the same impairments and children who are influenced by these parental behaviours [24]. As a rule, parenting style is closely related to early trauma and family experiences of the parents themselves, projected on their own children [23]. In this work, we use the most generally recognized parenting styles in the works of researchers, the connection of which with psychological disorders and dysfunctions in children has been proven [23, 25].

In the case of online learning, the child is more likely to be with the parents and may receive more support. On the other hand, in many cases, it may be easier for parents to communicate with a child who is under less stress due to social interactions [26]. In school, students' anxiety is closely related to academic problems; student-teacher relationship; parental expectations and students' self-perception [27]. Among main aspects in youth's life such as learning, body image, family relationship, peer relationship and self-improvement activities, learning was the most powerful predictor of anxiety. In online learning, online responses from teachers and peers, for example, in the form of comments on social networks or blogging, can provide both moral support and a socializing effect for students and affect the reduction of anxiety [28].

Although there has not been a high consensus among existing studies on the prevalence of anxiety disorder, the studies pointed out an alarming rate of anxiety at any age, especially children and adolescents. About 20% of children and adolescents suffer from an anxiety disorder, in which about 12% suffer from a severe anxiety disorder. Most existing studies on anxiety in Vietnam focused on the high school students, i.e. adolescents aged 16 to 18 [16-18].

This study aimed to investigate anxiety in classroom learning of secondary school students (from 11 to 15 years old) as a reason for applying online or blended learning. Learning is the main activity of the children at this age. We also examined the correlation between anxiety and other factors such as temperament, learning motivation, parental expectation, academic performance and family-related factors. The need for such a study is due to the importance of the influence of anxiety on the achievement of academic success and psychological health of students, not only in the context of Vietnam but throughout the world because the problem is widespread. The lack of studies of this kind in Vietnam is the gap that is intended to close this study.

METHODOLOGY

Participants

Vietnam is divided into 3 regions: northern, middle and southern region. We select 2 cities in the northern region (Hanoi city and Hai Duong province), 2 provinces in the middle region (Thanh Hoa and Ha Tinh provinces) and 1 city in the southern region (Ho Chi Minh city). Of the 5 cities and provinces selected, 2 are

big cities representing urban areas, and 3 are provinces representing rural areas. In each city, a secondary school was randomly selected. In each school, 150 students were randomly selected and invited to participate in the study. A total of 750 questionnaires were given out, 677 responses were collected, response rate: 90.27%. None of the study participants had any experience of online learning in the past and did not study online in any form during the study.

The sex ratio of the sample was consistent with the national sex ratio. The sample was distributed equally across years of study. Although the distribution of academic performance of students in this study was skewed towards high grades, this reflects the national trend of preference of grades to academic achievements. In general, the structure and characteristics of the sample are similar to the demographic characteristics of students in Vietnam secondary schools.

Measurements

All measures in this study were developed by the authors. To measure academic anxiety, we created a scale of 35 items, with 5 subscales: (i) anxiety due to difficulties in learning, (ii) anxiety due to parental expectation of academic performance, (iii) anxiety due to inferior to friends in learning, (iv) anxiety about academic ability, and (v) anxiety due to inadequate health in learning. Students were asked to rate how much anxiety they felt about these aspects in the last 1 month on a 5-point Likert scale (rarely to always). The scale was reliable: Cronbach's alpha = 0.846 for the whole scale and ranged from 0.84 to 0.85 for the subscales. Factor analysis was conducted to ensure construct validity: KMO coefficient = 0.846 > 0.5: Factor analysis was corresponding with the research data. Bartlett's test result was 23814,249 with significance level sig = 0.000 <0.05, showing that the data used for factor analysis was utterly suitable.

Perceived parenting style was measured by 18 items, including 9 items for mother and 9 identical items for father. The 9 items were divided into 3 subscales: authoritative, authoritarian and permissive parenting style. The Cronbach's alphas for the subscales were 0.865, 0.856 and 0.861 respectively. The perceived parental expectation of academic performance was measured by 10 items, referring to 2 types of expectations: the expectation of achievements in knowledge, skills and personality and expectation of

grades. The scale had good reliability: Cronbach's alpha = 0.849.

To determine temperament, the most modern methods described in work [29, 30] were used and are a rethinking of the long development of methods for testing, describing and determining a person's temperament. Temperament was assessed by 20 items, referring to 4 temperament types: choleric, phlegmatic, sanguine and melancholic. Cronbach's alpha for the whole scale (0.848) and four subscales was acceptable. Learning motivation was measured by 15 items, referring to 3 types of motivations: (i) learning to achieve knowledge, skills and personality, (ii) learning for high grades, and (iii) learning to meet parental/school expectations.

Perceived impacts of academic pressure on anxiety were measured by 5 items. Perceived impacts of anxiety on learning and health were measured by 15 items. Participation in class activities was identified by students' position in the class. Students reported if they participated in class management (i.e. monitor, vice monitor, team leader, etc.). Students holding positions in class management had higher participation in-class activities. Participants also answered demographic questions including gender, living area, year of study (grade 6, 7, 8, 9), last year academic performance (average and below, good or excellent, according to national standards set by Vietnam Ministry of Education and Training for yearly assessment).

Data Collection

Data collection was carried out by the authors with the support of headteacher in necessary cases. All concerns of the participants were shared and answered on the basis of ensuring the objectivity of the survey data.

Data Analysis and Statistical Methods

Both descriptive and analytical statistics were performed by SPSS (IBM Group). The significance level of $p < 0.05$ was used.

Ethical Issues

No personal data of the study participants or their families was collected, stored or used in the course of the study. All participants were recruited after obtaining personal consent and the consent of their families to participate in this work. The collection of statistical information was carried out exclusively using the

unique identifiers of the participants, which guaranteed the safety of confidentiality protection. The study fully meets all the ethical requirements for research on this topic. Research approved by the Institutional Review Board of Hanoi National University of Education.

RESULTS

Additional accurate Demographic characteristics of the sample were shown in Table **1**.

Table **2** present the descriptive statistic of the variables examined in this study.

Mean score of anxiety was 2.62 out of 5, median = 2.57. In other words, secondary school students frequently experienced anxiety in learning. Only 1.6% of students rarely felt anxious, and 3% of students always felt anxious about learning. We grouped students with anxiety mean score 1 and 2 standard deviations below the sample mean to form low anxiety group, and students whose anxiety score 1 and 2 standard deviations above the mean to form the high anxiety group. 15.5% of students in the sample belonged to the low anxiety group, while 16.7% of students felt in the high anxiety group.

Of the 5 aspects of academic anxiety, anxiety due to parental expectation of academic performance was the most frequently experienced (Mean =3.03, SD = 0.76; Median = 3.0), followed by anxiety due to

difficulties in learning (Mean = 2.73; SD = 0.76; Median = 2.71), anxiety about academic ability (Mean = 2.63; SD = 0.74; Median = 2.57), anxiety due to inferior to friends in learning (Mean = 2.54; SD = 0.73; Median = 2.43). The least common aspect of academic anxiety was anxiety due to inadequate health in learning (Mean = 2.17; SD = 0.75; Median = 2.14). According to students' rating, the most common parenting style was authoritative parenting style, and the least common style was authoritarian parenting style. Authoritative and authoritarian parenting styles were more common in mothers, while the permissive parenting style was more common in fathers.

Parents had a relatively high expectation of children's academic performance (M=3.67, SD = 0.79). Parents had a higher expectation in grades than in achievements in knowledge, skills and personality. Interestingly, students were most motivated to learn to meet their parents' and school's expectations (Mean = 3.51; Median = 3.40). Learning to gain knowledge was the weakest motivation (Mean = 2.57; Median = 2.40). Regarding students' temperament, phlegmatic and melancholic temperaments were most common, while choleric temperament was least common. Pressure from family, school on learning of students, had the mean at an average level (Mean = 2.53; Median = 2.40). The mean of the impacts of anxiety on students' physical and psychological health was low (Mean = 2.11; Median = 2.10).

Table 1:   Demographical Characteristics of Study Sample

No	Factors		Quantity	Percentage
1	Total samples		677	100%
2	Sex	Male	338	49.9%
		Female	339	50.1%
3	Grades	6	179	26.4%
		7	148	21.9%
		8	188	27.8%
		9	162	23.9%
4	Academic ability	Excellent	333	49.2%
		Good	259	38.3%
		Average	76	11.2%
		Weak	9	1.3%
5	Living area	Urban	299	44.2%
		Rural	378	55.8%
6	Participating in collective activities		279	41.2%

Table 2: Description of Anxiety Level, Style, Parental Expectations and Student's Temperament and Motivation

Factors	Mean	SD	Min	Max	Median
Academic anxiety	2.62	0.57	1.23	4.23	2.57
Anxiety due to difficulties in learning	2.73	0.76	1.00	5.00	2.71
Anxiety due to parental expectation of academic performance	3.03	0.76	1.00	5.00	3.00
Anxiety due to inferior to friends in learning	2.54	0.73	1.00	4.57	2.43
Anxiety about academic ability	2.63	0.74	1.00	5.00	2.57
Anxiety due to inadequate health in learning	2.17	0.75	1.00	4.43	2.14
Authoritarian parenting style	2.09	0.61	1.00	5.00	2.00
Father's authoritarian parenting style	2.06	0.80	1.00	5.00	2.00
Mother's authoritarian parenting style	2.12	0.70	1.00	5.00	2.00
Authoritative parenting style	3.38	0.95	1.00	5.00	3.33
Father's authoritative parenting style	3.22	1.10	1.00	5.00	3.33
Mother's authoritative parenting style	3.55	1.10	0.67	5.00	3.67
Permissive parenting style	3.04	0.79	1.00	5.00	3.00
Father's permissive parenting style	3.13	0.96	1.00	5.00	3.33
Mother's permissive parenting style	2.95	0.95	1.00	5.00	3.00
Parental expectations for children's grades	3.10	0.82	1.00	5.00	3.20
Parental expectations for children's academic achievements	3.67	0.79	1.40	5.00	3.80
Choleric temperament	2.24	0.51	1.00	4.40	2.20
Sanguine temperament	2.47	0.62	1.00	4.80	2.40
Melancholic temperament	3.01	0.95	1.00	5.00	3.00
Phlegmatic temperament	3.12	0.73	1.40	5.00	3.00
Motivation to learn for knowledge	2.57	0.94	1.00	5.00	2.40
Motivation to learn for grades	3.27	0.86	1.00	5.00	3.20
Motivation to learn to meet parents' and school's expectation	3.51	0.86	1.00	5.00	3.40
Perceived academic pressure from family and school	2.53	0.76	1.00	5.00	2.40
Perceived impacts of anxiety on physical and psychological health	2.11	0.65	1.00	4.25	2.10

Academic Anxiety by Comparison Parameters

Male students took the majority both in low anxiety (16.0%) and the high anxiety group (17.8%). In term of living area, rural students accounted for a higher percentage than urban students in the low anxiety group (17.4% and 13.0%, respectively), yet their rates in the high anxiety group were relatively similar (16.9% and 16.4%, respectively). As such, urban students had slightly higher academic anxiety than rural students. Students who actively participated in class activities had lower academic anxiety. The percentage of active students experiencing low anxiety was 16.7%, higher than the percentage of non-active students (13.4%); yet the percentage of active students experiencing high anxiety was 15.0%, lower than the percentage of non-active students (17.9%).

Academic anxiety increases with years of study. 6th graders had the highest percentage in the low anxiety group but the lowest percentage in the high anxiety group. 9th graders had the lowest percentage in the low anxiety group but the highest percentage in the high anxiety group. In term of student's academic performance, excellent students had less academic anxiety, as the percentage of excellent students in high anxiety group was lowest among 3 academic performance groups (14.7%). Average and weak students suffered significantly more anxiety as they account for the highest rate in the high anxiety group (25.7%) (Table **3**).

Table **4** report mean differences in students' academic anxiety by comparison parameters. In term of years of study, 7th, 8th and 9th graders had

Table 3:   Anxiety Levels in the Target Groups

| | | Min-2SD | | -2SD- (-1SD) | | (-1SD- (1SD) | | (1SD – (2SD) | | 2SD-Max | | |
| | | 1-1.48 | | 1.481-2.05 | | 2.051 - 3.19 | | 3.191 - 3.76 | | 3.761-5 | | |
		n	%	n	%	n	%	N	%	n	%	Total
Anxiety level		11	1.6%	94	13.9%	459	67.8%	93	13.7%	20	3.0%	677
Gender	Male	9	2.7%	45	13.3%	224	66.3%	49	14.5%	11	3.3%	338
	Female	2	0.6%	49	14.5%	235	69.3%	44	13.0%	9	2.7%	339
Living area	Rural	8	2.1%	58	15.3%	248	65.6%	50	13.2%	14	3.7%	378
	Urban	3	1.0%	36	12.0%	211	70.6%	43	14.4%	6	2.0%	299
Participation in-class activities	Yes	6	2.2%	46	16.5%	185	66.3%	33	11.8%	9	3.2%	279
	No	5	1.3%	48	12.1%	274	68.8%	60	15.1%	11	2.8%	398
Grade	6	2	1.1%	34	19.0%	119	66.5%	23	12.8%	1	0.6%	179
	7	2	1.4%	20	13.5%	100	67.6%	19	12.8%	7	4.7%	148
	8	2	1.1%	25	13.3%	128	68.1%	27	14.4%	6	3.2%	188
	9	5	3.1%	15	9.3%	112	69.1%	24	14.8%	6	3.7%	162
Last year academic performance	Excellent	5	1.5%	56	16.8%	223	67.0%	44	13.2%	5	1.5%	333
	Good	6	2.3%	34	13.1%	176	68.0%	32	12.4%	11	4.2%	259
	Average/Weak	0	0.0%	4	4.7%	60	70.6%	17	20.0%	4	4.7%	85

Table 4:   Difference in the Mean of Anxiety Scores Among the Surveyed Sample Groups

| TT | Factors | | N | Mean | SD | Difference | | | | |
						Mean	SE	95%CI		P
1	Gender*	Male	338	2.62	0.59	0.01	0.04	-0.08	0.09	0.86
		Female	339	2.62	0.55					
2	Living area*	Urban	299	2.62	0.54	-0.01	0.04	-0.09	0.08	0.87
		Rural	378	2.62	0.59					
3	Grade**	6	179	2.50	0.54	-	-	-	-	-
		7	148	2.65	0.59	0.15	0.06	0.03	0.28	0.016
		8	188	2.66	0.57	0.16	0.06	0.05	0.28	0.006
		9	162	2.68	0.57	0.18	0.06	0.06	0.30	0.004
4	Participating in classwork*	Yes	279	2.57	0.59	-0.09	0.04	-0.18	-0.01	0.04
		No	398	2.66	0.56					
5	Academic ability**	Excellent	333	2.58	0.56	-	-	-	-	-
		Good	259	2.62	0.59	0.04	0.05	-0.05	0.13	0.425
		Average/Weak	85	2.79	0.53	0.21	0.07	0.07	0.35	0.003
6	Conduct**	Good	450	2.61	0.56	-	-	-	-	-
		Fair	190	2.64	0.60	0.03	0.05	-0.06	0.13	0.501
		Average/Weal	37	2.66	0.55	0.05	0.10	-0.14	0.24	0.593

*Independent T test; ** Anova test.

significantly higher anxiety scores than 6th graders (M_d=0.15, 0.16 and 0.18, respectively). Students who actively participated in class activities had lower academic anxiety than less active students: M_d=- 0.09, SE = 0.04; p = 0.04). Students with excellent academic performance experienced less anxiety in learning than

average and weak students (M_d=-0.21, p=0.003); however, no statistically significant difference was observed between excellent students and good students. In other words, students with average and weak academic results were more anxious than students with excellent academic performance. There were no statistically significant differences in academic anxiety between students of different gender and living area groups.

Correlations between Academic Anxiety in Secondary School Students and other Factors

Academic anxiety was significantly correlated with parenting style, parental expectation, learning motivation, temperament, perceived impacts of academic pressure on anxiety and perceived impacts of anxiety on learning and health (see Table **5**).

Authoritarian parenting style had a weak correlation with academic anxiety: R=0.227 [B=0.26; SE of B = 0.03]. Authoritative parenting style had an even weaker correlation with academic anxiety: R=-0.109; [B=- 0.07; SE of B= 0.02]). Parental expectations for students' academic performance is weakly correlated with anxiety: R=0.446; [B = 0.31; SB of B = 0.02]. Among the three learning motivations, students' motivation towards higher grades (R= 0.46; [B=0.31; SE of B = 0.02]) and motivation to meet parents' and school's expectation (R= 0.32; [B= 0.21; SB of B= 0.02]) were significantly correlated anxiety.

In terms of temperament, two types of temperament had positive correlation with the students' anxiety: Melancholic temperament had moderate correlation (R= 0.584; [B=0.35; SB of B= 0.02]) and choleric temperament had very weak correlation (R= 0.136; [B= 0.151; SB of B= 0.02]). Academic pressure from family and school was also moderately and positively correlated with anxiety (R=0.53; [B= 0.40; SB of B = 0.02]). It was noteworthy that there was a relatively strong correlation between perceived impacts of anxiety to learning and health and academic anxiety: R= 0.647; [B= 0.570; SB of B = 0.026]). Other variables examined in this study had no significant correlation with academic anxiety.

Predictors of Academic Anxiety in Secondary School Students

To examine predictors of academic anxiety in secondary school students, we ran multivariate linear regression. The factors included in the model were grade, participation in class activities, academic performance, last year academic performance, parenting styles, parental expectation, temperament, learning motivation and pressure from parents and school. The model explained 58.3% of the variation in students' anxiety score. Factors which statistically predict academic anxiety included: Good academic performance: 0.08 [95% CI 0.01 - 0.14]; Average academic performance: 0.2 [95% CI 0.10 - 0.29]; Authoritarian parenting style: 0.07 [95% CI 0.02 - 0.12];

Table 5: **Correlation between Students' Anxiety Scores and Factors of Parenting Style, Motivation, Academic Motivation and Pressure from Family and School**

Factors	R	R^2	B	SE of B	p
Score of frequent expression of autocratic level	0.227	0.077	0.26	0.03	0.00
Score of frequent expression of democratic level	-0.109	0.012	-0.07	0.02	0.00
Score of frequent expression of free level	0.038	0.001	0.03	0.03	0.33
Parental expectations for their children's academic performance	0.446	0.199	0.31	0.02	0.00
Parental expectations for their children's academic achievements	0.029	0.001	0.02	0.03	0.45
Academic motivation towards knowledge	-0.019	0	-0.01	0.02	0.63
Academic motivation towards academic performance	0.468	0.219	0.31	0.02	0.00
Academic motivation towards the expectations of parents and school	0.32	0.102	0.21	0.02	0.00
Choleric temperament	0.136	0.018	0.151	0.042	0.00
Sanguine temperament	-0.012	0	-0.01	0.04	0.75
Melancholic temperament	0.584	0.341	0.35	0.02	0.00
Phlegmatic temperament	0.068	0.005	0.05	0.03	0.08
Academic pressure from family and school	0.53	0.281	0.40	0.02	0.00
Effects of anxiety	0.647	0.418	0.570	0.026	0.00

Parental expectations of grades: 0.12 [95% CI 0.08 - 0.16]; Parental expectations for their children's academic achievements: -0.06 [95% CI (-0.10) – (-0.01)]; Choleric temperament: 0.07 [95% CI 0.01 - 0.13]; Melancholic temperament 0.24 [95% CI 0.20 - 0.27]; Motivation to learn for knowledge: -0.05 [95% CI (-0.08) - (-0.02)]; Motivation to learn for grade: 0.15 [95% CI 0.12 - 0.19]; Pressure from family and school: 0.20 [95% CI 0.15 - 0.24].

DISCUSSION

This is the first study on academic anxiety among secondary school students in classroom learning in Vietnam. With a structured self-assessment scale, we had identify the prevalence of academic anxiety of secondary school students. About 15.5% of secondary school students had low academic anxiety and 16.7% had high academic anxiety, in which about 3.0% had very high anxiety. This result was similar to Do's study on anxiety in high school students [14], but higher than Pham [16], who found 12% of high school students had anxiety disorder. Some previous studies found higher rate of anxiety in high school students, ranging from 20% [18] to 28% [17]. It is necessary to note that our finding was similar to the percentage of Asian children suffering from anxiety disorders [6] and it was lower than the percentage of American children suffering [3, 31].

In addition, our survey found that there was no significant difference in academic anxiety between male and female students or between urban and rural students. This was different from previous studies, in which female students' anxiety was often higher than male students' [5]. This result is also supported by research using specialized teaching methods such as gamification, blended learning and flip classes [26, 32, 33]. However, there was a tendency of increased academic anxiety as students progressed to higher grade. Students who participated in class work such as leaders and other activities had less anxiety. The average and weak students had more academic anxiety than the good and excellent students [7, 8].

The use of games during learning is natural for the psychology of younger students and is part of the digital experience of secondary school students. Researches shows an increase in engagement, motivation, and a slight improvement in cognitive processes in secondary school students as a result of gamification of learning [33]. Games can be both educational, containing school course material, and a special psychological intention aimed at reducing anxiety, increasing motivation, strengthening social skills, etc. [32]. Research shows that intelligent curriculum gamification is particularly effective when combined with other modern teaching methods such as flip classroom and blended learning. Gamification involves two areas. The first is the transformation of the traditional classroom learning process into a game form in a teacher-controlled framework. The second is the use of digital games available in mobile gadgets or in computers with which classrooms are equipped as a substrate for recognizing educational material. The technique of creating specialized educational games containing educational material as a substrate for "passing game levels", etc. is increasingly used [34, 35]. Studies indicate that the use of educational gamification tools is more effectively implemented in the learning process in blended or online learning [26]. Parenting style could predict children's anxiety. Parents who frequently expressed authoritative parenting style would increase their children's academic anxiety and parents who frequently expressed authoritarian style would reduce their children's anxiety level; in which the correlation model of autocratic educational style, creating an increase in the students' anxiety level was more predictable than the democratic educational style model. This finding was consistent with studies by Eisemann *et al.* [21], Bijl *et al.* [22], Anl and Karsl [23].

Academic anxiety knows no boundaries and has already been demonstrated to be equally common throughout the world, in developing and developed countries alike. Similarly, anxiety is similar in primary, secondary, high school, and college, suggesting that the problem is more of a behavioral problem than a curriculum problem [4, 6, 9, 14].

Parental expectations about their children's academic performance were also a predictor of academic anxiety. We found that parents often had high expectations for children's grades and academic achievements; these expectations were correlated with anxiety. Studies of anxiety in online learning do not show this correlation; the determining factor for online learning is motivation and readiness for conscious learning [7]. The higher parental expectations for their children's grades were, the more anxiety children could experience. On the contrary, the higher the parental expectations for their children's academic achievement were, the lower children's academic anxiety was. Similarly, when students were motivated to learn for grades, they felt more academic anxiety; but when they were motivated to learn for knowledge, they felt less

anxiety. Similar results were obtained for online education [26, 28], with the difference that students have more opportunities to acquire time management skills and more opportunities for motivation from loved ones. The same pattern was found in high school students [15, 36]. In addition, students who had melancholic or choleric temperament, especially choleric temperament could predict high level of anxiety. Temperament is not a critical factor in online learning, which implies the obligatory formation of an individual rhythm and a learning path that takes into account the characteristics of the student [37].

To sum up, academic anxiety in secondary school students in schoolroom learning is predicted parenting styles, parental expectation, learning motivation and temperament. Of all these factors, only motivation for learning is significant for online learning, and there it is achieved more easily with the support of parents. In this study, we found both enhancers and inhibitors of academic anxiety. Therefore, it is important to consider protective factors in order to reduce academic anxiety of secondary school students.

CONCLUSIONS

The study of academic anxiety of secondary school students in classroom learning among Vietnamese children is relevant due to the widespread occurrence of this phenomenon and its impact on the productivity and academic achievement of students. The findings had identified the prevalence of academic anxiety in secondary school students and predictors of academic anxiety, most of which can be reduced by partial or full use of online learning. Students with excellent academic performance experienced less anxiety in learning. It was found that a certain temperament significantly correlates with the manifestations of academic anxiety. Melancholic temperament had moderate correlation and choleric temperament had very weak correlation. However, statistically significant differences in academic anxiety between students of different gender and living area groups have not been established. Factors that affect anxiety in classroom but not in online learning were determined including parenting style, parental expectation for academic achievements and students' temperament. Only learning motivation is a factor that determines both learning styles equally. Regression model could provide useful suggestions for parents, teachers and students in reducing academic anxiety for students including the use of full or blended online learning. Further research on this topic should focus on

measuring the effectiveness and scope of application and the results of specific techniques that can effectively reduce anxiety in Vietnamese students of various ages. The results of this and the aforementioned expected future studies are practically important for use in primary and secondary schools in most countries, since the problem of anxiety is widespread in the world.

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