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Impact Of Diversity In Music Learning to Promote Music Learning to Non-Music Major Undergraduates

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ABSTRACT

Purpose: Global music education is developing rapidly, but the music learning of non-music major undergraduates (NMMUs) seems to be stagnant. This study discusses the factors (self-efficacy, communication, perception, motivation, learning environment, culture and AI) that influence NMMUs music learning and proposes diversified music learning. **Methodology:** This study adopted mixed research design, applied on a stratified sample (n=463) of undergraduates of Dalian Maritime University; and the relationship between these factors and NMMS music learning was discussed through statistical analysis. A few participants (n=38) were invited to semi-structured interviews. The thematic analysis further verified the statistical results and developed the diversity of music learning. **Findings:** NMMUs has a positive attitude toward diversified music learning, which can reduce learning difficulties, increase practical opportunities, provide personalized learning experiences, and in-depth exploration of knowledge and achieve a deeper learning effect. **Implication for Research and Practice:** This study shows the way to promote music learning by diversifying music learning. This provides new insights for the development of music education and fills in the current discourse on the effective music learning of NMMUs. This study also highlights the importance of understanding the actual music learning needs of NMMUs. We suggest further expansion of the sample size and geographic scope to broaden the applicability of the research findings.

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Introduction

Non-music major undergraduates (NMMUs) refer to all students in a university except music majors. Getting an opportunity to learn music has many benefits for NMMUs, such as cultivating confidence, teamwork ability, preparation for psychotherapy, problem-solving ability, and others. Therefore, higher education institutions provide music learning opportunities for all NMMUs in the form of elective courses (except for professional music universities). Scholars have been committed to constantly improving their music learning experience and optimizing teaching methods. While music calls for cultivating students' positive learning motivation and improves their enthusiasm for learning (Chen, 2024), it also enhances self-efficacy which is one of the strongest predictors of students' academic performance (Zelenak, 2024). Though motivation and self-efficacy are not absolute, since people with high self-efficacy may also show low motivation if they do not pay attention to expected outcomes (Schunk & DiBenedetto, 2020).

A pleasant learning environment created by satisfying communication between teachers and students can also encourage students to actively participate in music learning (Storsve, 2024). Communication takes place not only in face-to-face classrooms, but also during the opportunities after class through technical media (Fecke et al., 2023). In this process, students complete the in-depth exploration of knowledge and achieve a deeper learning effect (Yu et al., 2023). For this reason, it is important that music should be taught in a real cultural context and that its cultural background should be taken into consideration when evaluating the content and process, which will help students deepen their understanding of music (Zhou, 2023; Zou et al., 2024). Skills, knowledge, and attitudes acquired by students in such an environment will have high practical value (Johnson & Majewska, 2022).

Furthermore, the importance of music perception training in music learning is obvious (Juntunen, 2020). Various researchers use game strategies (Juntunen, 2020), positive teacher behavior in the classroom (de Bruin, 2021) and appropriate music learning environment to create conditions for improving music perception. Lv (2023) believed that the use of artificial intelligence (AI) is a valuable tool for music learning because it provides a flexible and personalized teaching environment. It will greatly inspire more young students to discover and explore the meaning of music, and from passive learning to active learning (Li & Wang, 2023). With the rapid development of science and technology, global music education has entered a new stage of development. However, the music teaching model of NMMUs seems to remain in the traditional teaching model. NMMUs does not value learning music, nor do they see it as a useful part of academic methods in their lives. Therefore, they have little motivation to attend classes. Therefore, it is very important to develop and study a new music teaching model (Jones et al., 2024; Lv, 2023). Clear teaching objectives, rich and varied course contents can guide students to discover the inherent characteristics of music (Zhou, 2023).

The current study, therefore, attempted to deeply understand the actual music needs of NMMUs, and confirm the factors that influence their music learning. A need was felt to develop diversified music learning to promote music among NMMUs. In addition, the existing research had failed to give sufficient attention to NMMUs, especially to the people in the background of China. This study also endeavored to improve the effective discourse of NMMUs music education through empirical data. For this purpose, the following research questions were proposed in the study: (1) What factors promote music learning of

NMMUs? (2) What does NMMUs' diversified music learning include?

Literature review

In previous studies, most common influencing factors related to music learning include motivation, self-efficacy, perception, communication, learning environment, culture, and Artificial Intelligence (Chen, 2024; Gill et al., 2022; Goodrich, 2024; Nwagwu & Akintoye, 2023). However, the factors that influence a person's choice, effort, persistence, and achievement are complex and diverse (Schunk & DiBenedetto, 2020). It is necessary to discuss these factors systematically to further clarify their relationship with NMMUs music learning. It is generally believed that cultivating students' positive learning motivation can improve their enthusiasm for learning (Chen, 2024; Hadjikou, 2021). Scholars advocated improving motivation to learn through a series of informal and participatory music practices. For example, cooperative behavior among peers helps students of different ages to improve their knowledge and performance skills together (Goodrich, 2024); by using flip online classroom, students can participate in course preparation through pre-recorded videos and collaborative activities in face-to-face online courses, thus improving their learning satisfaction; moreover, gamification learning can promote the effectiveness of music creation (Robert et al., 2023); based on the integration of local culture into music learning, it can better meet the learning needs of students (Zhou, 2023; Zou et al., 2024); the embodied interaction or increased visual cues will help students to play the rhythm accurately (Yu et al., 2023) and so on.

Many empirical studies have confirmed that people with high self-efficacy are more likely to achieve their learning goals, while people with low self-efficacy are more likely to avoid tasks or challenges (Gill et al., 2022; Lewis & Hendricks, 2022; Zelenak, 2024). In China, Chen (2024) showed that self-efficacy can explain 61% of changes in students' participation in music learning and 77% of changes in their motivation. In Australia, a study by Gill et al. (2022) showed that music teachers develop students' self-efficacy by paying attention to students' mastery experiences and using oral persuasion. It should be noted that continuous music practice influences students' positive emotions, participation, and sense of accomplishment (Jiang, 2024). Researchers have also studied other factors that contribute to music learning. It has been proven that equal communication among teachers, students, and peers can better encourage students to express their ideas and help them move from passive absorption of knowledge to independent participation in classroom activities (de Bruin, 2021). This type of communication is not limited to the classroom. Under the background of the high development of network technology, both software and platforms can support effective interaction, create effective dialog (Nwagwu & Akintoye, 2023), improve students' attitude towards music learning (Jones et al., 2024).

Music perception is an important embodiment of musical ability. There is evidence that people who have had formal music training for a long time have advantages in music perception (Juntunen, 2020). However, the reality we face is that NMMUs does not have enough professional music training and cannot guarantee enough practice time. Therefore, we prefer to cultivate music perception ability through informal music learning. Informal learning includes a wider range of learning methods (Storsve, 2024), which helps to meet the diverse learning needs of NMMUs. For example, sports aesthetics on music learning (Juntunen, 2020). Action-based activities enable all students to participate in music education without specific skills and knowledge. This background is very consistent with the actual situation of NMMUs. In addition, the experimental results of Lahdelma and

Eerola (2020) showed that participants with less musical training are more likely to distinguish their own musical preferences when they are familiar with cultural stimulus. Familiar culture not only helps students deepen their understanding of music, but also makes the skills, knowledge, and attitudes acquired by students have high practical value (Zhou, 2023).

Empirical research has confirmed that there is also a relationship between the learner and the learning environment. Modern technology offers more possibilities for music learning. An experimental data showed that interactive tools participate in the learning process, which promotes the development of students' practical music skills (Yang, 2022). The experimental group achieved higher scores than the control group in music perception and musical rhythm performance. Lv (2023) also conducted a similar study. He integrated traditional music culture into modern vocal music teaching. Experimental results have shown that students' learning objectives scores were higher in the experimental class than in the control class. In addition, AI is considered as an appropriate tool to support music learning, because it can provide more flexible and personalized learning opportunities (Lohr et al., 2024) and have an impact on the educational environment (Rohwer, 2023). The use of AI can improve academic performance by 15%, allowing students to learn musical instruments and create music in an interesting and relaxed way (Li & Wang, 2023). These findings showed that diversity music learning can enhance students' musical skills ability, effectively improve their musical literacy, and then improve the overall level of music education.

Problem Statement

NMMUs come from a variety of backgrounds. Some are exposed to music at an early age. Others grow up in economic hardship and had limited opportunities for continued musical education. Obviously, there are differences in the musical level and learning needs of the NMMUs. Empirical research has confirmed that students' values about the subjects they study are highly dependent on the teaching methods adopted and advocated by each music teacher (Mateos-Moreno & Bravo-Fuentes, 2023). This means that understanding students' musical academic abilities and needs, and providing inclusive and diversified music instruction (Yi, 2023) are expected to improve their learning interest and participation. In addition, there are many important predictors of student interest and participation in music learning (Elpus & Abril, 2024). Positive learning motivation and self-efficacy are considered one of the strongest predictors of students' academic performance (Jiang, 2024). Project-based learning method and game strategy (Gamboa Mora et al., 2021; Robert et al., 2023) have been shown to have a positive impact on students' learning motivation and self-efficacy.

Some scholars point out that teachers' positive behavior in class (Chen, 2024) and communication between teachers and students are also important factors to encourage students to actively participate in music learning (Todd, 2020). Interactive classroom teaching (Yang, 2022) can effectively promote teacher-student communication and improve students' learning interesting. moreover, music education should also be inclusive of students from diverse backgrounds. Studies have shown that music teachers have a positive attitude towards adding informal music environments to formal music education in schools (Armellini et al., 2021). Other researchers with the same opinion are Mateos-Moreno and Bravo-Fuentes (2023) and Nwagwu and Akintoye (2023). They advocated avoiding the use of textbooks to learn music but combining music games in informal music

environments or some learning software or platforms to cultivate students' creativity. For example, modern science and technology, represented by AI, is increasingly applied to music learning (Lv, 2023), which expands the channels for obtaining resources and provides more and more effective training opportunities for improving music perception. In addition, the integration and development of music learning and local culture can better meet students' learning needs (Lim et al., 2024; Zhou, 2023) and deepen their understanding of music (Bond & Russell, 2021).

China has a background of music research mainly based on speculative method (Yang, 2022). However, effective music learning is more likely to happen in the actual needs of students, which also highlights the importance of empirical research. This is mainly reflected in the following three aspects: research methods, research population, the combination of theory and practice. The first aspect of research methods in the field of China's music education takes speculative research as the main research trend (Yang, 2022). This is a disturbing trend as it can hide the bias of researchers. This will not enable us to obtain real information. Empirical research can ensure scientific, standardization and objectivity to a great extent. Second, the research population experience factors related to music learning, but they still lack sufficient understanding of music learning. For example, in the research on the application of AI in higher education, it is difficult to find cases related to NMMUs music learning (Crompton & Burke, 2023). Finally, there is a big gap between theory and practice in NMMUs music learning. To consider the many benefits of music learning, the Chinese government attaches great importance to NMMUs music learning and requires every NMMU to complete the corresponding music credits before graduation. However, the reality is that NMMUs have low motivation and participation in music learning. This shows that effective music learning is more likely to occur in the actual needs of students, which further emphasizes the need for empirical research.

Motivation is the hottest topic in international music education research. However, previous studies have mainly focused on music learning, deliberate practice, and motivational constraints in the context of classical music (Schmidt & Gruber, 2022). It has the characteristics of paying special attention to individuals without considering groups, and music majors without considering non-music majors (Schmidt & Gruber, 2022). This obviously cannot help us understand NMMUs deeply.

Hence, there are methodological shortcomings in the existing teaching which have both direct and indirect effects on students' motivation and self-efficacy. These shortcomings include overly theoretical music instruction or indiscriminate group instruction. This traditional and widely used teaching method ignores students' personality (Yi, 2023) and music practice (Mateos-Moreno & Bravo-Fuentes, 2023). As a result, NMMUs has low learning interest and participation. The current research attempted to bring together all these factors of self-efficacy, communication, perception, motivation, AI technology, culture, and learning environment to study their impact on music learning of NMMUs. For this purpose, the following hypotheses were framed:

H1: *Self-efficacy has a positive and significant impact on music learning of NMMUs.*
H2: *Communication has a positive and significant impact on music learning of NMMUs.*
H3: *Perception has a positive and significant impact on music learning of NMMUs.*
H4: *Motivation has a positive and significant impact on music learning of NMMUs.*
H5: *AI technology has a positive and significant impact on music learning for NMMUs.*
H6: *Culture has a positive and significant impact on music learning of NMMUs.*

H7: *Learning environment has a positive and significant impact on music learning of NMMUs.*

Methodology

Research design

This study adopted the mixed method research design. A total of 463 students and 5 teachers from Dalian Maritime University participated in the study. In the quantitative stage, we confirmed the relationship between influence factors and NMMUs.

Sampling

Stratified sampling and systematic sampling were used to identify sample for the distribution of questionnaires online. In the qualitative stage, purposive sampling was used to invite participants for the semi-structured interviews. A survey link was sent to 463 participants through the Questionnaire Star platform and successfully recovered all 463 questionnaires. After eliminating the invalid questionnaires, the number of valid questionnaires was 447, and the effective recovery rate was 96.54%.

Data collection

The questionnaire items belonged to independent variables viz., self-efficacy, communication, perception, motivation, AI technology, culture and learning environment and dependent variable of music learning. Each variable was tested through a tool borrowed from previous studies: Music Teaching Course Attitude Scale (Saygı, 2010), Music Performance Self-Efficiency Scale (Zelenak, 2020), Communication Scale (Goodboy et al., 2009), Perceived Learning Scale (Rovai et al., 2009), Motivation Scale (Hadjikou, 2021), AI Attitude Scale (Grassini, 2023), School Culture Scale (Dumay, 2009), and Learning Environment Scale (Kember & Leung, 2009).

Data analysis

A descriptive statistical analysis was conducted on all eight variables. The mean values fluctuated between the median values of 3-4, and the standard deviations were close to 1, indicating that the sample had little deviation in the overall evaluation of the questionnaire and was generally positive. Besides, Cronbach's alpha and KMO were used to analyze the values of all eight dimensions. Independent samples t-test and one-way ANOVA were used to examine the differences of demographic variables. The hypothesis model was then tested using multiple linear regression. In the qualitative phase, NVivo software was used to analyze and code the themes identified from the interview content and perform thematic analysis.

Results

On January 22, 2024, the researchers conducted a pilot study after obtaining the approval of the Ethics Committee of Dalian Maritime University. Pilot study collected 176 valid questionnaires and tested the reliability (Table 1) and validity through *KMO and Bartlett's Test* (Table 2) of items of the questionnaire.

Table 1

Reliability Statistics

Variable	Cronbach's Alpha	N of Items
Music learning of NMMU	0.966	25
Self-efficacy	0.972	22
Communication	0.932	8
Perception	0.929	8
Motivation	0.975	26
Artificial Intelligence	0.870	4
Culture	0.957	17
Environment	0.953	15

Table 2 highlights the validity through *KMO and Bartlett's Test* which showed an acceptable value of 0.953

Table 2

KMO and Bartlett's Test

KMO Measure of Sampling Adequacy		0.953
Bartlett's Test of Sphericity	Approx. Chi-Square	43109.198
	df	7750
	Sig.	<0.001

To test the influence of demographic variables on the data, we conducted a difference analysis. First, an independent samples t-test was used. The data showed that there was a significant difference between male and female in AI, and the mean value of male was significantly higher than that of female (Table 3).

Table 3

Gender Differences Analysis

	Gender (M±SD)		*t*	*p*
	Male	Female		
Music learning of NMMU	3.10±0.81	3.18±0.83	-0.902	0.367
Self-efficacy	3.20±0.94	3.05±0.95	1.520	0.129
Communication	3.12±1.00	3.19±0.99	-0.665	0.506
Perception	3.24±0.94	3.12±0.98	1.229	0.220
Motivation	3.23±0.92	3.12±0.94	1.173	0.241
Artificial Intelligence	3.33±1.03	3.11±1.01	2.094	0.037*
Culture	3.25±0.86	3.27±0.88	-0.126	0.900
Environment	3.07±0.89	3.14±0.90	-0.744	0.457

* $p<0.05$ ** $p<0.01$

There was a significant difference between music club experience on music learning of NMMUs, and the mean value with music club experience was significantly higher than that without music club experience. The experience of music club showed a significant difference in culture, and the mean value with music club experience was significantly higher than that without music club experience (Table 4).

Table 4

Music Club Experience Differences Analysis

	Music Club Experience (M±SD)		*t*	*p*
	Yes	No		
Music learning of NMMU	3.32±0.76	3.12±0.84	2.074	0.040*
Self-efficacy	3.26±0.92	3.06±0.95	1.688	0.092
Communication	3.14±1.02	3.17±0.99	-0.243	0.808
Perception	3.03±0.99	3.18±0.97	-1.277	0.202
Motivation	3.27±0.88	3.13±0.95	1.170	0.243
Artificial Intelligence	3.02±1.01	3.21±1.02	-1.469	0.143
Culture	3.46±0.77	3.22±0.89	2.371	0.019*
Environment	3.13±0.85	3.12±0.91	0.061	0.952

* $p<0.05$ ** $p<0.01$

Music class experience had a significant difference on music learning of NMMU, and the mean value with music class experience was significantly higher than that without music class experience (Table 5).

Table 5

Music Class Experience Differences Analysis

	Music Class Experience (M±SD)		*t*	*p*
	Yes	No		
Music learning of NMMU	3.28±0.76	3.09±0.85	2.380	0.018*
Self-efficacy	3.19±0.92	3.04±0.96	1.595	0.111
Communication	3.16±1.00	3.17±1.00	-0.128	0.898
Perception	3.22±0.96	3.13±0.97	0.899	0.369
Motivation	3.20±0.93	3.13±0.94	0.797	0.426
Artificial Intelligence	3.09±1.02	3.22±1.02	-1.281	0.201
Culture	3.24±0.88	3.27±0.88	-0.366	0.715
Environment	3.11±0.89	3.13±0.90	-0.178	0.859

* $p<0.05$ ** $p<0.01$

Next, a one-way ANOVA was used to examine the differences between the two demographic variables: grade (Table 6) and discipline (Table 7) on variables. The data showed that there were significant differences in AI across disciplines.

Table 6

Grade Differences Analysis

	Grade (M±SD)				*F*	*p*
	Freshman	**Sophomore**	**Junior**	**Senior**		
Music learning of NMMU	3.06±0.84	3.25±0.80	3.21±0.81	3.11±0.86	1.296	0.275
Self-efficacy	3.06±0.96	3.08±0.96	3.20±0.92	3.03±0.94	0.712	0.545
Communication	3.20±1.05	3.14±1.04	3.36±0.92	2.99±0.95	2.603	0.051
Perception	3.17±0.94	3.03±0.96	3.24±1.02	3.18±0.97	0.988	0.398
Motivation	3.05±0.94	3.25±0.90	3.21±0.93	3.10±0.97	1.119	0.341
Artificial Intelligence	3.09±1.01	3.23±1.04	3.18±0.98	3.21±1.07	0.417	0.741
Culture	3.29±0.84	3.15±0.89	3.31±0.87	3.30±0.92	0.849	0.468
Environment	3.07±0.94	3.05±0.89	3.14±0.90	3.21±0.85	0.740	0.528

* $p<0.05$ ** $p<0.01$

Table 7

Discipline Differences Analysis

	Discipline (M±SD)						*F*	*p*
	Literature	**Management**	**Legal science**	**Economics**	**Science**	**Engineering**		
Music learning of NMMU	3.23±0.80	3.10±0.93	3.10±0.80	2.94±0.85	2.95±0.68	3.19±0.83	0.862	0.506
Self-efficacy	2.88±0.96	2.82±1.02	3.27±0.86	2.82±0.90	3.12±0.91	3.12±0.95	1.136	0.340
Communica-tion	3.10±0.96	3.13±1.04	3.09±1.11	3.17±1.00	3.04±1.05	3.18±0.99	0.081	0.995
Perception	3.28±0.92	3.67±1.25	2.60±0.94	3.07±0.94	3.13±0.92	3.18±0.96	1.953	0.084
Motivation	3.40±1.07	3.07±1.14	2.87±0.90	3.02±1.01	3.02±0.93	3.18±0.92	0.792	0.556
Artificial Intelligence	2.60±0.89	2.42±1.19	2.74±1.12	2.91±0.98	2.58±1.14	3.29±0.99	4.921	0.000**
Culture	2.99±0.81	2.66±1.05	3.20±0.81	3.15±0.90	3.00±0.92	3.31±0.87	1.702	0.133
Environment	3.22±0.83	2.84±0.93	2.84±0.75	2.88±0.94	2.81±0.94	3.18±0.89	1.722	0.128

* $p<0.05$ ** $p<0.01$

After multiple comparisons, the mean score of AI in engineering was significantly higher than that in other disciplines (Table 8).

Table 8

Multiple Comparisons of Artificial Intelligence

(I)	(J)	(I)Mean	(J)Mean	Mean Difference (I-J)	*p*
Literature	Management	2.604	2.417	0.188	0.671
Literature	Legal science	2.604	2.737	-0.133	0.719
Literature	Economics	2.604	2.906	-0.302	0.359
Literature	Science	2.604	2.583	0.021	0.959
Literature	Engineering	2.604	3.291	-0.687	0.020*
Management	Legal science	2.417	2.737	-0.320	0.429
Management	Economics	2.417	2.906	-0.490	0.185
Management	Science	2.417	2.583	-0.167	0.706
Management	Engineering	2.417	3.291	-0.874	0.010**
Legal science	Economics	2.737	2.906	-0.169	0.543
Legal science	Science	2.737	2.583	0.154	0.677

Legal science	Engineering	2.737	3.291	-0.554	0.019*
Economics	Science	2.906	2.583	0.323	0.327
Economics	Engineering	2.906	3.291	-0.385	0.022*
Science	Engineering	2.583	3.291	-0.708	0.016*

* p<0.05 ** p<0.01

Prior to the regression analysis, a correlation analysis was performed. The data showed (Table 9) that there was a significant correlation between each independent variable and the dependent variable.

Table 9

Pearson Correlation Coefficients

	Music learning of NMMU
Self-efficacy	0.310**
Communication	0.332**
Perception	0.179**
Motivation	0.333**
Artificial Intelligence	0.261**
Culture	0.290**
Environment	0.277**

* *p*<0.05 ** *p*<0.01

The hypothesis model was then tested using multiple linear regression. The data shows that demographic variables would not affect the music learning of NMMUs. These seven independent variables can explain the dependent variable by 24.1% as shown in Table 10.

Table 10

Multiple Linear Regression and Collinearity

	Hierarchical 1					**Hierarchical 2**				
	B	***t***	***p***	**Collinearity Statistics**		***B***	***t***	***p***	**Collinearity Statistics**	
				Tolerance	**VIF**				**Tolerance**	**VIF**
Constant	3.086**	32.681	.000	-	-	.708**	3.170	.002	-	-
Gender= Male	-.131	-1.495	.136	.940	1.064	-.168*	-2.166	.031	.914	1.094
Gender= Female	-	-	-	-	-	-	-	-	-	-
Grade=Freshman	-.018	-.157	.875	.610	1.639	-.007	-.073	.942	.597	1.674
Grade=Sophomore	.183	1.637	.102	.659	1.517	.193	1.959	.051	.644	1.554
Grade=Junior	.132	1.190	.235	.666	1.501	.063	.646	.518	.648	1.544
Grade=Senior	-	-	-	-	-	-	-	-	-	-
Discipline=Literature	.066	.271	.787	.985	1.015	.157	.733	.464	.963	1.039
Discipline=Management	-.163	-.582	.561	.977	1.023	.047	.187	.851	.940	1.064
Discipline=Law	-.126	-.647	.518	.977	1.023	.065	.375	.708	.947	1.056
Discipline=Economics	-.244	-1.770	.077	.974	1.027	-.105	-.862	.389	.951	1.051
Discipline=Science	-.248	-1.026	.306	.988	1.012	-.061	-.287	.774	.972	1.029
Discipline= Engineering	-	-	-	-	-	-	-	-	-	-
Music Club Experience=Yes	.160	1.413	.158	.846	1.182	.128	1.272	.204	.815	1.227
Music Club Experience=No	-	-	-	-	-	-	-	-	-	-

	Hierarchical 1					Hierarchical 2				
	B	*t*	*p*	Collinearity Statistics		*B*	*t*	*p*	Collinearity Statistics	
				Tolerance	VIF				Tolerance	VIF
Music Class Experience=Yes	.141	1.523	.128	.805	1.242	.131	1.611	.108	.789	1.267
Music Class Experience=No	-	-	-	-	-	-	-	-	-	-
Self-efficacy						.105**	2.594	.010	.781	1.280
Communication						.128**	3.303	.001	.777	1.287
Perception						.083*	2.246	.025	.900	1.111
Motivation						.136**	3.368	.001	.811	1.233
AI						.100**	2.713	.007	.818	1.222
Culture						.099*	2.258	.024	.787	1.271
Environment						.102*	2.472	.014	.844	1.185
R^2			.038					.279		
Adj R^2			.013					.249		
F	F (11,435) =1.548, p = .112					F (18,428) = 9.201, p < .001				

Dependent Variable: music learning of NMMU
Note. * p < .05 ** p < .01

A few student representatives who had participated in the quantitative stage were invited to participate in face-to-face semi-structured interviews. The selection of the samples considered the differences in discipline, gender, music club experience, and music learning experience. In addition, two managers and three music teachers were also interviewed to provide more in-depth information. We used NVIVO software to analyze and code the interview content. Four themes were found in the interviews with music educators (Table 11). The interviews of NMMUs were subject analyses according to the structure of seven independent variables (Table 11).

Table 11

Theme Analysis

Educators		NMMU	
Themes	**Sub-themes**	**Themes**	**Sub-themes**
Educational equity		Motivation	
	Blended learning		Interest
	Continuous learning		Credit
	Social support		Skill
Personalized design			Misgiving
	Actual demand	Communication	
	Enthusiasm		Teacher
	Technology		Schoolmate
Support		Self-efficacy	
	Policy		Purposeful study
Combine with daily life			Opportunity
	School characteristics	Learning environment	
	Environmental		Atmosphere

Similar experiences		Teaching methods Diversification
	Culture	
		Participate
	Artificial Intelligence	
		Curiosity Assist
	Perception	
		Chance Confidence

Findings reveal that motivation, communication, self-efficacy, learning environment, AI, culture and perception have a positive and significant impact on NMMUs music learning. These findings were further verified in the subsequent semi-structured interviews. The NMMUs have a positive attitude towards diversified music learning. This can be attributed to the following: First, it reduces the learning difficulty. NMMUs can choose suitable learning methods and learning contents according to their own level; Second, it increases practical opportunities. It integrates music learning into daily life, not just theoretical teaching in the classroom. This also increases the opportunities for practice, and helps students deepen their understanding and mastery of musical knowledge; Third, it enables the realization of educational equity. It allows all NMMUs to participate in music learning by providing personalized learning experiences, regardless of learning background and skill level.

Discussion

This study answered the first research question through statistical analysis. The results indicate that all seven hypotheses were valid. Some factors (self-efficacy, communication, perception, motivation, learning environment, culture, and AI) have an influence on NMMUs music learning. These findings are consistent with previous studies. Chen (2024) believed that cultivating students' positive learning motivation and self-efficacy can enhance their enthusiasm for learning. Storsve (2024) further stated that a satisfactory learning environment is also an important factor in encouraging students to actively participate in music learning. This includes teaching music in a real cultural context (Zou et al., 2024), improving effective dialogue between teachers and students (Nwagwu & Akintoye, 2023), integrating online technology represented by AI into music education (Li & Wang, 2023), and expanding channels for training music perception (Lv, 2023). The difference between people, as shown by the statistical data, further emphasizes the importance of diversified music learning. Mateos-Moreno and Bravo-Fuentes (2023) claimed that the teaching strategies used by teachers directly affect students' feelings about music learning. Yi (2023) emphasized that music teachers should provide diversified music teaching according to the differences of students. This can improve their learning interest and participation.

Data from subsequent semi-structured interviews further verified the statistical findings and answered the second research question. The findings provided a deep

understanding of the music learning needs of NMMUs. Diversified learning needs and low musical literacy are the main reasons that hinder NMMUs' effective music learning. In addition, they also hope to expand the knowledge acquisition channels and increase the practice opportunities. Based on this feedback and the presentation of statistical data, diversity in music learning was proposed. It makes up for the shortcomings of the existing teaching methods, such as excessive theoretical teaching, lack of music practice, ignoring students' personality, and so on. This conclusion is supported by the existing research. Yi (2023) emphasized that excessive theoretical music teaching methods and ignoring students' personality development are the main reasons for students' low interest in learning and participation. Mateos-Moreno and Bravo-Fuentes (2023) advocated avoiding the use of textbooks to learn music and cultivating students' positive learning attitudes through different learning strategies in an informal music environment. Nwagwu and Akintoye (2023) approved for cultivating students' creativity by using music learning software or intelligent platforms in a formal learning environment.

Conclusion

The results of this study have made a great contribution to the existing literature. This study has shown the way to promote NMMUs music learning by adopting diversified music learning. This provides new insights into the development of music education, as previous research findings are limited. This study fills the current discourse on NMMUs' effective music learning. Moreover, it supports the relationship between influencing factors and NMMUs' music learning with statistical data, thus improving the understanding and development of NMMUs' music learning dynamics for educational institutions and teachers. In line with the theoretical contribution, the practical implications of this study are also very important.

This study emphasizes the importance of understanding the actual learning needs of NMMUs to develop diversified music learning. This has the advantage of fully mobilizing students' participation and interest. Therefore, it is suggested that diversified music learning should be formulated in NMMUs music learning to improve the learning experience and cultivate positive learning motivation. Consistent with other studies, this study acknowledges several limitations. First, the sample size and geographical scope should be expanded to broaden the applicability of the study. Second, there are differences in culture and economy in different countries and regions. Therefore, the diversified music learning proposed in this study should be extended to universities facing the same challenges and provide insights from a broader perspective.

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