A CORRELATIONAL STUDY ON MUSIC STUDENTS' MENTORSHIP PERCEPTION AND LEARNING OUTCOMES IN THE CONTEXT OF COGNITIVE APPRENTICESHIP

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Abstract: This study examined the relationship between mentorship perception and learning outcomes among music college students under the cognitive apprenticeship model. The research targeted music major students at SIAS University in Zhengzhou, Henan Province. It utilized a survey method to collect data on demographic variables, including gender, grade, residence, and major, as well as mentorship perception, which encompassed academic support, social support, and exemplar, and learning outcomes, which included cognition, skills, and emotional value. The findings revealed that mentorship perception and learning outcomes significantly differed based on students' majors. Moreover, a significant positive correlation was identified between mentorship perception and learning outcomes, indicating that students with a more favorable mentorship perception achieved better learning outcomes. These results highlighted the importance of cognitive apprenticeship in music education and its potential to enhance student learning. The study further discussed these findings and provided educational recommendations, emphasizing the necessity for music educators to strengthen cognitive apprenticeship practices, particularly in academic and social support, to improve student's learning outcomes.

Keywords: Cognitive Apprenticeship, Mentorship Perception, Learning outcomes, Music College Students

Introduction

Cognitive apprenticeship, grounded in situated learning theory, was widely adopted in music education to enhance student–teacher interaction and promote musical independence. Through observation, imitation, and feedback, this approach improved students' critical thinking, creativity, self-expression, decision-making, and professional growth (De Bruin, 2019; Pang, 2017; Weidner, 2018; Xu, 2009). In music education, learning outcomes were primarily reflected in the development

of musical skills, critical thinking, and emotional engagement (Lehmann, Sloboda, & Woody, 2007; Weidner, 2018).

As global awareness of music education increased, governments and institutions invested in fostering cross-cultural communication and promoting cultural diversity. The global music education market, valued at $10.2 billion in 2022, was projected to grow at an annual rate of 5.3% (Grand View Research, 2022). In China, music education played a key role in cultivating aesthetic appreciation and innovative thinking. The market reached 113.38 billion RMB in 2021, with strong future growth expected, especially in preschool and K–12 sectors (Zang, 2022). The expansion of the music industry relied on high-quality professionals, contributing to both cultural and economic development.

Zhengzhou, the capital of Henan Province, possessed a strong music education system that nurtured local talent and contributed to regional economic and cultural growth. Examining mentorship perceptions and learning outcomes was essential for enhancing instructional quality, with cognitive apprenticeship providing an effective model for developing students' musical skills through expert guidance and feedback. As globalization continued to shape the field, research on mentorship and learning outcomes remained critical for advancing educational reform and improving student performance.

Research Objectives

(1) To understand the demographic distribution of music students at SIAS University in Zhengzhou, China, including their gender, grade, residence, and major direction.

(2) To assess the level of mentorship perception among music students under cognitive apprenticeship.

(3) To evaluate the level of learning outcomes among music students under cognitive apprenticeship.

(4) To explore the difference in mentorship perception among music students with varying demographic variables under cognitive apprenticeship.

(5) To explore the difference in learning outcomes among music students with varying demographic variables under cognitive apprenticeship.

(6) To investigate the correlation between mentorship perception and learning outcomes among music students under cognitive apprenticeship.

Literature Review

The Theory and Definition of Cognitive Apprenticeship

Cognitive apprenticeship, introduced by Collins et al. (1989), blends traditional apprenticeship with cognitive theory to enhance skill learning through contextualized cognitive processes. Building on Vygotsky's sociocultural theory and Bruner's cognitive development theory,

cognitive apprenticeship emphasizes social interaction and cultural context in learning. The model focuses on situated learning, where students master complex skills through expert demonstrations, guided practice, and feedback, ultimately enhancing their cognitive abilities (Brown, Collins & Duguid, 1989). The model has been successfully applied in various fields, such as science, mathematics (Hmelo-Silver, 2004), and the arts (Burnard, 2008). It includes stages like teacher demonstration, contextualized guidance, and student-driven inquiry, fostering skill development in real-world contexts (Guo, 2017). Studies highlight cognitive apprenticeship's ability to enhance student motivation, learning outcomes, and its relevance to professional skill development (Wang, 2009; Chen, 2009).

The Application of Cognitive Apprenticeship in Music Education

Cognitive apprenticeship has proven effective in music education, especially in enhancing musical skills, creativity, and critical thinking. Through observation, imitation, and feedback, students develop musical independence and judgment (Weidner, 2018). In music, applying cognitive apprenticeship models—particularly in improvisation and ensemble performance—helps students improve performance abilities and creativity (De Bruin, 2019; Xu, 2009). In instrumental and vocal teaching, expert demonstrations and feedback strategies enhance students' technical skills and musical expression (Pang, 2017). Real-time feedback in music education is crucial for learning complex skills, with significant improvements in student engagement and emotional resonance with music (Hattie & Timperley, 2007; Standley, 2008). Thus, cognitive apprenticeship in music fosters both cognitive and emotional growth, supporting continuous learning and professional development.

The Definition and Dimensions of Mentorship Perception

Mentorship perception refers to an apprentice's subjective evaluation of their relationship with the mentor, encompassing perceptions of academic support, social support, and the mentor's role as an exemplar. This perception plays a critical role in shaping learning outcomes and career development. Studies show that mentorship perception not only involves the support provided by the mentor but also how the apprentice internalizes this guidance (Liu, 2023). Key dimensions of mentorship perception include academic support (help with academic tasks), social support (emotional and psychological encouragement), and exemplar (role model influence) (Scandura & Ragins, 1993). In music education, mentorship perception influences students' cognitive, skill, and emotional development, impacting their learning outcomes (Topping, 1996; Bandura, 1997). A positive mentorship perception can enhance students' confidence, autonomy, and overall learning achievements (Rojabi, 2021).

The Definition and Dimensions of Learning Outcomes

Learning outcomes, a central concept in educational research, have evolved to encompass cognitive, skill, and emotional dimensions. Initially grounded in behaviorist theories (Skinner, 1953), the concept was expanded by Bloom's Taxonomy (1956) into cognitive, affective, and psychomotor

dimensions. Contemporary definitions highlight learning outcomes as encompassing knowledge acquisition, skill mastery, and emotional value, such as self-confidence and achievement (Biggs, 2003; Pekrun et al., 2007). In music education, learning outcomes are assessed across cognition (knowledge understanding), skills (musical technique), and emotional value (engagement with music), reflecting a holistic approach to student development (Weidner, 2018). These dimensions guide curriculum design and teaching quality assessments, with learning outcomes being a core standard for educational effectiveness (Biggs & Tang, 2007).

The Impact of Different Demographic Factors on Mentorship Perception and Learning Outcomes

Demographic factors like gender, socioeconomic status, and living environment significantly influence mentorship perception and learning outcomes in cognitive apprenticeship models. Research indicates that similarities between mentors and apprentices (e.g., gender or race) can enhance the quality of mentorship and learning outcomes (Li et al., 2018). Socioeconomic status and family education levels also impact students' cognitive and skill development, with students from higher socioeconomic backgrounds generally achieving better outcomes (Liu et al., 2017). Additionally, students' living environments, such as urban versus rural settings, affect learning outcomes, with urban students often benefiting from better resources and opportunities (Meyer et al., 2017). Gender and academic major further influence mentorship perception, with certain disciplines showing stronger mentor-mentee relationships (Sullivan & Levy, 2011). However, in higher education, factors such as personal motivation and academic strategies tend to have a greater impact on learning outcomes than demographic factors alone (Marcinkus Murphy, 2012).

Methodology

This study aimed to investigate the impact of cognitive apprenticeship on mentorship perception and learning outcomes among music students at SIAS University in Zhengzhou, China. The study population consisted of students from various academic years, genders, residences, and majors. The total enrollment at SIAS University in the 2024 academic year was 1,495, and the sample size, calculated using Krejcie & Morgan's (1970) formula, included 306 participants. Convenience sampling was employed, and participants completed online questionnaires, with a high response rate of 97%, resulting in 297 valid responses.

The survey was conducted via an online platform, with questionnaires distributed within the institution’s internal learning community and through email. After an introductory explanation, students voluntarily completed the surveys. The collected data was manually cleaned and analyzed using SPSS 23.0, employing descriptive statistics to summarize demographic information and key variables such as gender, age, grade, and major. To test hypotheses and explore differences between groups, t-tests and ANOVA were used. Pearson correlation analysis was performed to assess the

relationship between mentorship perception and learning outcomes.

The questionnaire was adapted from existing validated scales: the "Mentorship Perception Scale" (Liu, 2023) and the "Learning Outcomes Impact Scale" (Feng, 2021), incorporating demographic background questions. The instrument included three parts: an introductory section, personal demographic details (gender, age, residence, major), and the main scales for mentorship perception (academic support, social support, and exemplar) and learning outcomes (cognition, skills, emotional value). Each scale used a 5-point Likert scale to assess respondents' views, with the scoring ranges indicating levels of mentorship perception and learning outcomes, from "very low" to "very high."

Reliability was measured using Cronbach's alpha, with values exceeding 0.8 for both scales, indicating good internal consistency. Factor analysis was conducted to assess the validity of the scales. The KMO value of 0.890 indicated suitability for factor analysis, and Bartlett's test ($p = 0.000$) confirmed the appropriateness of the factor structure. The cumulative variance explained was 73.844%, indicating high validity.

Results

Demographic Analysis of Questionnaire Participants

This study collected 306 questionnaires through an online survey, with 297 valid responses. The first section of the questionnaire aimed to understand the demographic background of music students at SIAS University. The gender distribution was fairly balanced, with 50.8% male and 49.2% female students. Regarding grade levels, 31.6% of participants were senior students, while freshman, sophomore, and junior students had relatively equal proportions, ensuring balanced representation across all grades. In terms of residence, 60.3% of participants were from urban areas, which may be attributed to the higher availability of music education resources in cities. As for major specialization, Vocal Music and Opera and Musical Theatre had the highest proportions of students, at 33.0% and 29.3%, respectively, while Instrumental Music and Computer Music Production had the smallest proportions. These results provide a comprehensive sample representing various student demographics.

Descriptive Analysis of Academic Motivation and Learning Outcomes

Statistical analysis of mentorship perception and learning outcomes among music students at SIAS University was performed using SPSS 26.0 software. The results indicated that both mentorship perception ($M=3.98$, $SD=1.04$) and learning outcomes ($M=4.04$, $SD=1.00$) were rated highly by students. Within mentorship perception, academic support ($M=3.99$, $SD=1.04$), social support ($M=3.97$, $SD=1.05$), and exemplar ($M=3.97$, $SD=1.12$) received similar high ratings, with exemplar slightly standing out, suggesting mentors' positive influence through leading by example. In terms of learning outcomes, the highest mean score was found in the emotional value dimension ($M=4.06$,

SD=1.01), followed by skills (M=4.04, SD=1.00) and cognition (M=4.02, SD=1.05). These findings suggest that cognitive apprenticeship positively impacted students' emotional engagement, practical skills, and theoretical knowledge in music learning.

Table 1: The Levels of Mentorship Perceptions and Learning Outcomes

Dimension	M	SD	Interpretation
Academic support	3.99	1.04	High
Social support	3.97	1.05	High
Exemplar	3.97	1.12	High
Mentorship Perceptions	3.98	1.04	High
Cognition	4.02	1.05	High
Skill	4.04	1.00	High
Emotional value	4.06	1.01	High
Learning Outcomes	4.04	1.00	High

Analysis of the Differences in the Mentorship Perception and Learning Outcomes Under Different Background Variables

1) Testing of Research Hypothesis H1 and H2

As shown in Table 2, no significant differences were found in academic support, social support, exemplar, or overall mentorship perception ($p > .05$). Therefore, Hypotheses H1-1 and H2-2, which proposed significant gender differences in mentorship perception and learning outcomes under cognitive apprenticeship, were invalid.

Table 2: Independent Sample T-Test Analysis of Mentorship Perception and Learning Outcomes by Gender

Dimension	Gender				t	p
	Male (n=151)		Female (n=146)			
	M	SD	M	SD		
Academic Support	3.89	1.06	4.09	1.00	-1.65	.100
Social Support	3.92	1.10	4.03	0.99	-0.95	.345
Exemplar	3.91	1.15	4.03	1.10	-0.90	.368
Mentorship Perception	3.91	1.07	4.05	1.00	-1.20	.233
Cognition	3.95	1.056	4.10	1.05	-1.23	.220
Skill	3.96	1.033	4.12	0.97	-1.39	.166
Emotional Value	3.96	1.039	4.16	0.98	-1.73	.085
Learning Outcome	3.96	1.028	4.13	0.97	-1.47	.141
Cognition	3.95	1.056	4.10	1.05	-1.23	.220
Skill	3.96	1.033	4.12	0.97	-1.39	.166
Emotional Value	3.96	1.039	4.16	0.98	-1.73	.085
Learning Outcome	3.96	1.028	4.13	0.97	-1.47	.141

As shown in Table 3, the p-values for mentorship perception across different grades were all greater than .05, indicating no significant differences. Therefore, Hypotheses H1-2 and H2-2, which proposed grade-based differences in mentorship perception and learning outcomes under cognitive apprenticeship, were invalid.

According to the analysis in Table 4, no significant differences were found in academic support, social support, exemplar, or total mentorship perception between students from rural and urban backgrounds ($p > .05$). Thus, Hypotheses H1-3 and H2-3 were invalid.

Table 3: ANOVA Analysis of Mentorship Perception and Learning Outcomes by Grade

Dimension	Grade	n	M	SD	F	p
Academic support	Freshman	68	3.89	0.95	0.32	.810
	Sophomore	68	4.01	1.04		
	Junior	67	4.01	1.08		
	Senior	94	4.04	1.08		
Social support	Freshman	68	3.84	1.00	0.47	.702
	Sophomore	68	4.01	1.09		
	Junior	67	4.04	1.02		
	Senior	94	3.99	1.08		
Exemplar	Freshman	68	3.86	1.07	0.38	.771
	Sophomore	68	3.97	1.12		
	Junior	67	4.06	1.12		
	Senior	94	3.99	1.18		
Mentorship Perception	Freshman	68	3.86	0.98	0.38	.767
	Sophomore	68	4.00	1.07		
	Junior	67	4.04	1.05		
	Senior	94	4.01	1.06		
Cognition	Freshman	68	3.92	1.05	0.37	.772
	Sophomore	68	3.99	1.10		
	Junior	67	4.06	1.09		
	Senior	94	4.09	1.00		
Skill	Freshman	68	3.93	0.96	0.37	.778
	Sophomore	68	4.06	1.00		
	Junior	67	4.07	1.05		
	Senior	94	4.09	1.02		
Emotional Value	Freshman	68	3.98	1.02	0.23	.875
	Sophomore	68	4.07	1.00		
	Junior	67	4.05	1.02		
	Senior	94	4.11	1.02		
Learning Outcomes	Freshman	68	3.94	1.00	0.32	.814
	Sophomore	68	4.04	1.00		
	Junior	67	4.06	1.04		
	Senior	94	4.10	1.00		

Table 4: Independent Sample T-test Analysis of Mentorship Perception and Learning Outcomes by Residence

Dimension	Residence				t	p
	Rural(n=118)		Urban(n=179)			
	M	SD	M	SD		
Academic Support	4.02	1.02	3.97	1.05	0.35	.729
Social Support	3.97	1.05	3.97	1.05	0.02	.988
Exemplar	3.98	1.15	3.96	1.11	0.12	.908
Mentorship Perception	3.99	1.05	3.97	1.03	0.16	.870
Cognition	4.01	1.10	4.02	1.02	-0.07	.941
Skill	4.04	1.05	4.04	0.97	0.02	.982
Emotional Value	4.04	1.05	4.07	0.99	-0.20	.841
Learning Outcomes	4.03	1.05	4.04	0.97	-0.09	.928

According to the analysis in Table 5, no significant differences were found in mentorship perception, learning outcomes, or their dimensions between students from rural and urban backgrounds ($p > .05$). Therefore, Hypotheses H1-3 and H2-3 were invalid.

As shown in Table 6, significant differences were found in mentorship perception and learning outcomes among students from different majors ($p < .05$). Post hoc comparisons were conducted due to significant differences across all dimensions and total scores. Table 7 presented the following trend: Computer Music Production < Instrumental Music < Choral Conducting < Vocal Music < Opera and Musical Theatre. These results indicated that mentorship perception and learning outcomes varied significantly by major under the cognitive apprenticeship model.

Correlation Analysis

This study used Pearson correlation analysis to explore the linear relationship and significance between mentorship perception and learning outcomes. By calculating the correlation coefficient (r), the linear relationship between variables was quantified: when $r > 0$, it indicated a positive correlation; when $r < 0$, it indicated a negative correlation; when $r = 0$, it indicated no correlation. Table 7 presented the results of the Pearson correlation analysis in mentorship and learning outcomes in this study. In the results, there were positive relationship among mentorship perception, learning outcomes, and all their dimensions. Therefore, hypothesis H3 was valid.

Discussion

High Levels of Mentorship Perception and Learning Outcomes

The findings showed that both mentorship perception and learning outcomes were high among music students. This was likely due to close mentor–student relationships and a growing focus on professional development, especially during the post-pandemic recovery in the music industry. Personalized guidance was highly valued, supporting the effectiveness of the cognitive apprenticeship model in enhancing mentorship and learning outcomes.

Table 5: ANOVA Analysis of Mentorship Perception and Learning Outcomes by Major

Dimension	Major	n	M	SD	F	p
Academic Support	Vocal Music	98	4.29	0.99	13.26	.000
	Instrumental Music	26	3.48	1.09		
	Opera and Musical Theater	87	4.37	0.87		
	Music Theory	33	3.35	1.01		
	Choral and Conducting	29	3.64	0.77		
	Computer Music Production	24	3.24	0.92		
Social Support	Vocal Music	98	4.26	0.98	13.94	.000
	Instrumental Music	26	3.43	1.13		
	Opera and Musical Theater	87	4.39	0.80		
	Music Theory	33	3.28	1.02		
	Choral and Conducting	29	3.66	0.84		
	Computer Music Production	24	3.22	1.11		
Exemplar	Vocal Music	98	4.28	1.05	15.88	.000
	Instrumental Music	26	3.31	1.19		
	Opera and Musical Theater	87	4.46	0.84		
	Music Theory	33	3.22	1.15		
	Choral and Conducting	29	3.59	0.86		
	Computer Music Production	24	3.16	1.08		
Mentorship Perception	Vocal Music	98	4.28	0.97	15.42	.000
	Instrumental Music	26	3.41	1.12		
	Opera and Musical Theater	87	4.40	0.80		
	Music Theory	33	3.28	1.03		
	Choral and Conducting	29	3.63	0.78		
	Computer Music Production	24	3.21	1.02		
Academic Support	Vocal Music	98	4.30	0.99	14.88	.000
	Instrumental Music	26	3.50	1.11		
	Opera and Musical Theater	87	4.47	0.80		
	Music Theory	33	3.33	1.03		
	Choral and Conducting	29	3.67	0.84		
	Computer Music Production	24	3.22	1.07		
Social Support	Vocal Music	98	4.37	0.87	17.57	.000
	Instrumental Music	26	3.50	1.03		
	Opera and Musical Theater	87	4.46	0.79		
	Music Theory	33	3.32	1.00		
	Choral and Conducting	29	3.66	0.81		
	Computer Music Production	24	3.26	1.04		
Exemplar	Vocal Music	98	4.37	0.94	15.36	.000
	Instrumental Music	26	3.49	1.10		
	Opera and Musical Theater	87	4.45	0.80		
	Music Theory	33	3.42	0.91		
	Choral and Conducting	29	3.74	0.83		
	Computer Music Production	24	3.25	1.01		
Learning Outcomes	Vocal Music	98	4.35	0.90	16.63	.000
	Instrumental Music	26	3.50	1.07		
	Opera and Musical Theater	87	4.46	0.79		
	Music Theory	33	3.36	0.97		
	Choral and Conducting	29	3.69	0.81		
	Computer Music Production	24	3.24	1.01		

Differences in Mentorship Perception and Learning Outcomes Based on Demographics

No significant differences were found across gender, grade, or residence, suggesting that students in the same academic environment received comparable support. This may reflect increased gender equality and standardization in higher education. However, significant differences emerged by major; students in Vocal Music and Opera and Musical Theatre reported higher mentorship perception and learning outcomes than those in Computer Music Production, possibly due to closer mentor–student interactions in performance-based fields.

Positive Correlation Between Mentorship Perception and Learning Outcomes

The study found a significant positive correlation between mentorship perception and learning outcomes, particularly in academic support, social support, and exemplar. This aligned with previous research showing that mentor support and role modeling enhanced students' learning and professional growth. The results highlighted the value of cognitive apprenticeship in supporting both cognitive and emotional development in music education.

Table 6: Post-hoc Comparison of Mentorship Perception and Learning Outcomes by Major

Dimension	Post-hoc comparison results
Academic Support	Computer Music Production< Instrumental Music< Choral and Conducting< Vocal Music< Opera and Musical Theater
Social Support	Computer Music Production< Instrumental Music< Choral and Conducting< Vocal Music< Opera and Musical Theater
Exemplar	Computer Music Production< Instrumental Music< Choral and Conducting< Vocal Music< Opera and Musical Theater
Mentorship Perception	Computer Music Production< Instrumental Music< Choral and Conducting< Vocal Music< Opera and Musical Theater
Cognition	Computer Music Production< Instrumental Music < Choral and Conducting< Vocal Music < Opera and Musical Theater
Skill	Computer Music Production< Instrumental Music < Choral and Conducting< Vocal Music < Opera and Musical Theater
Emotional Value	Computer Music Production< Instrumental Music < Choral and Conducting< Vocal Music < Opera and Musical Theater
Learning Outcomes	Computer Music Production< Instrumental Music < Choral and Conducting< Vocal Music < Opera and Musical Theater

Conclusions

This study examined the correlation between mentorship perception and learning outcomes among music students at SIAS University under the cognitive apprenticeship model. The findings revealed no significant differences in mentorship perception or learning outcomes based on gender, grade, or residence, but significant differences were observed across academic majors. Students

majoring in Vocal Music and Opera and Musical Theatre reported higher mentorship perception and learning outcomes compared to those in Computer Music Production. Additionally, a strong positive correlation was found between mentorship perception and learning outcomes, with academic support, social support, and mentor exemplar playing key roles in enhancing students' cognition, skills, and emotional value. These results highlighted the positive impact of cognitive apprenticeship on mentorship and learning outcomes in music education.

Table 7: Correlation Analysis of the Relationship Between Academic Motivation and Learning Outcomes

	1	2	3	4	5	6	7	8
1. Academic Support	1							
2. Social Support	.916**	1						
3. Exemplar	.900**	.933**	1					
4. Mentorship Perception	.965**	.977**	.973**	1				
5. Cognition	.920**	.927**	.935**	.954**	1			
6. Skill	.894**	.897**	.908**	.926**	.939**	1		
7. Emotional Value	.901**	.898**	.908**	.928**	.935**	.958**	1	
8. Learning Outcomes	.923**	.925**	.935**	.955**	.977**	.984**	.983**	1

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