ISSN: 2948-4863

ISSN: 2948-4863

Journal of Advances in Humanities Research (JADHUR) is a scientific, international, peer-reviewed, and open-access journal devoted to the field of Humanities and provides rapid publication of articles frequently in its issues. JADHUR publishes 4 issues per year under United Frontiers Publisher. JADHUR publishes original research papers, review articles, case studies and reports etc. JADHUR is the place for exchanging information and research results within all areas of HUMANITIES and allied fields.

Generally, accepted papers will appear online within 2-3 weeks. The journal publishes original papers including but not limited to the following fields:

- Anthropology
- Tourism
- Sociology
- History
- Criminology
- Cross-Cultural Studies
- Development Studies
- Education
- Human Geography
- International Relations
- Law
- Linguistics
- Literature
- Political Science
- Women Studies
- Social Psychology

Journal of Advances in Humanities Research (JADHUR) operates through the peer-review process and is associated with the United Frontiers Publisher. It is not associated with or does not represent any governmental, non-governmental organization, or any public or private university.

Note: Authors are requested to submit their work electronically by using JADHUR online submission system. Please follow the instructions provided on each step during the online submission process. Please follow the Author's Guidelines before submission.

Articles in JADHUR are Open Access contents published under the Creative Commons Attribution-*CC BY 4.0 license* International License https://creativecommons.org/licenses/by/4.0/ .

 ISSN: 2948-4863

Editorial Board

Editor-in-Chief
Shakir Ullah, Ph.D
Cultural anthropology
info@jadhur.com

Associate Editor
Ahdi Hassan
Global Institute for Research Education & Scholarship: Amsterdam, Netherlands

EDITORIAL BOARD
Dr Usman Khan
North Minzu University Yinchuan City, Ningxia Province, P.R China.
Prof Dr Yuriy Shvets
Financial University under the Government of the Russian Federation
Carmen Lúcia Guimarães de Mattos
Ph.D in Education, University of Pennsylvania
CEO PRISMAS, Rio de Janeiro, Brazil.
Prof Dr Khalil Ur Rahman
Department of Sociology, Hazara University Mansehra, Pakistan
Prof Dr Kamal Pasa
Department of anthropology
University of Rajshahi, Bangladesh
Dr Sabbar Dahham Sabbar
Hasanddin University (UNHAS), Indonesia
Dr Tahir Jahan Khan
National College of Business Administration and Economics (NCBA&E)
Lahore, Pakistan
Dr. Shahid Bashir
Professor of Marketing and Analytics, Tecnologico de Monterrey, Mexico
Dr Giulio Ongaro
London School of Economics (LSE), United Kingdom
Dr. Ayesha Habib Khan
Lecturer of Anthropology at the University of Azad Jammu & Kashmir
Dr. Samia Awad Mohamed Hassan
PhD in Legal Studies, Prince Mohammad Bin Fahd University, Saudi Arab
Dr. Muhammad Suliman
Ph.D Sociology, Department of Sociology, Selcuk University, Turkey
Dr Qasim Jan
Ph.D Education, School of Education, Zhejiang Normal University, P.R China
Prof. Dr Madhurima Dasgupta
Ph.D in Sociology, School of Management and Social Sciences, The Neotia University, West Bengal, India
Dr. Dandan Tang
PhD in Child Education, Faculty of Teacher Education, Lishui University, Lishui ciry, 323000, Zhejiang province, China
Dr. Takaharu Oda
Ph.D in Philosophy, Southern University of Science and Technology

ISSN: 2948-4863

Table of Content

1	**Bridging Expectations and Satisfaction: The Effectiveness of After-School Music Training at Meiledi Art Center, Nanning, China** *Fang Zhiping, Sarayut Khan, Kanokkan Kanjanarat*	**1-26**
2	**Exploring the Nexus of Students' Happiness at School: The Moderating Effect of Student Engagement** *Ruibin Gao, Qingqing Shi, Haipeng Wu*	**27-50**
3	**The Role of Digital Media in Shaping Public Relations: Developing Successful Online Communication Strategies for Enterprises** *Ran An*	**51-68**
4	**Artificial Intelligence (AI) and Augmented Reality (AR) in Preschool Education: Innovative Applications** *Dan Wang*	**69-89**

JADHUR

Vol.3, Issue.3, (2024)

Journal of Advances in Humanities Research

https://doi.org/10.56868/jadhur.v3i3.232

Bridging Expectations and Satisfaction: The Effectiveness of After-School Music Training at Meiledi Art Center, Nanning, China

Fang Zhiping[1], Sarayut Khan[1], Kanokkan Kanjanarat[1]*

1. The Graduate School of Bansomdejchaopraya Rajabhat University, Thailand

Article Information

Article Type: Research Article

Dates:
Received: 09 July 2024
Revised: 10 September 2024
Accepted: 12 September 2024
Available online: 13 September 2024

Copyright:

This work is licensed under creative common licensed ©2024

Corresponding Author: K.K

ORCID: https://orcid.org/0009-0006-9623-6633

Kanokkan.ka@bsru.ac.th

ABSTRACT

This study explores the effectiveness of after-school music training programs at the Meiledi Art Centre in Nanning, China, focusing on aligning student expectations and satisfaction across key dimensions of the educational experience. Objective: The objectives were to assess the demographic characteristics of students, evaluate their satisfaction levels with the programs, and identify key factors influencing their overall experience.A structured questionnaire was administered to 217 students aged 12 to 18 years, collecting data on satisfaction across five core dimensions: Supporting Environment, Course Content, Teaching Method, Teaching Material, and Learning Method. Descriptive and inferential statistical analyses, including correlation analysis and ANOVA, were employed to analyze the data. The findings reveal high overall satisfaction among students, with the "Supporting Environment" receiving the highest ratings, reflecting the center's success in creating a conducive learning atmosphere. However, the "Learning Method" dimension received the lowest satisfaction scores, indicating areas where pedagogical improvements are needed. The results from hypothesis testing further supported the significance of these dimensions, with all five hypotheses confirming positive relationships between the quality of each dimension and overall student satisfaction. Notably, the supporting environment had the strongest impact on satisfaction ($\beta = 0.44$, $p < 0.001$). The ANOVA results indicated consistent satisfaction across different class types and campuses, with marginal significance favoring singing classes and the Liangqin campus. Additionally, the study highlights the demand for enhanced performance opportunities, improved digital infrastructure, and more diverse instrument rentals, reflecting evolving student needs. This study contributes to the broader discourse on music education by providing empirical evidence on the importance of aligning educational offerings with student expectations in a culturally diverse context.

Keywords: After-school music training, Student satisfaction, Student expectation, Educational enhancement

1. INTRODUCTION

In recent years, art education has gained increased attention and priority in China's national education policies, which is part of a larger transformation in the country. This was highlighted by President Xi Jinping at the 19th National Congress of the Communist Party of China in October 2017, stating that Chinese socialism has entered a new era, marked by a significant change in the primary societal contradiction: the growing demand for a better life among the people and the unbalanced and inadequate development. As people's material and cultural needs reach higher levels, there is a burgeoning enthusiasm for education that can express and fulfill aesthetic and spiritual pursuits (Xinhua News Agency, 2017). The integration of art skills into the National College Entrance Exam (高考Gao Kao) scoring system reflects a recognition of the growing importance of holistic education (Ministry of Education of the People's Republic of China, 2014). Later, The State Council General Office's emphasis in 2015 on standardized development and strengthened supervision of off-campus art training aligned with these broader socio-political changes (State Council General Office, 2015). Additionally, as shown on the website of the Minister of Education, at the 2020 National Education Work Conference emphasized the transformation of art education from a 'soft task' to a 'hard indicator' within supervision, evaluation, and assessment systems (General Office of the Central Committee of the Communist Party of China and the General Office of the State Council, 2020).

In this evolving landscape, institutions like the Meiledi Art Center in Nanning, Guangxi, emerged to cater to the increasing demand for after-school art training. In the context of this study, after-school training focuses specifically on extracurricular music education and training for children, including instruction in singing and instrumental music. Meiledi Art Center's educational philosophy aligns with the arts curriculum outlined in China's national curriculum standards, providing children with additional music training opportunities outside of school can enhance their skills, engagement, and well-rounded development. It is, however, important to note that not only cognitive well-being is enriched by the after-school music programs, but the social and emotional well-being as well. For instance, playing in a music ensemble group teaches students about teamwork, cooperation, and social relations since people need to work together to make music (Wang et al., 2022). Furthermore, the process of learning and performing music affect positively students' self-esteem and confidence because students learn and perform music and get positive feedback from their instructors and peers (Creech et al., 2013). In view of these findings, which include social-cognitive and affective components, after-school music programs should be a critical part of comprehensive schooling.

Although the importance of music education has been assessed, overall outcomes of after-school music programs are highly dependent on how much these programs satisfy the needs of participants. It means that students' expectations widely differ and may range from the expectations to get skills to develop – academic or another – to personal satisfaction and self-fulfillment (Provenzano et al., 2020). When expectations are met or exceeded as identified by participants, there are high chances that the outcomes in terms of level of satisfaction can enhance their engagement and, in the process, record high outcomes (Chong & Kim, 2010). On the other hand, if the expectations and the experiences do not tally, the result will be disappointment, diminished morale, and possibly a high attrition rate from the program. For post-school music programs, the expectation-satisfaction paradigm is highly applicable because emotions and opinions do matter in the delivery of musical learning. From the expectation-confirmation theory provided by Yun (2011) it can be deduced that satisfaction depends on the extent to which the consumption experience meets the consumer's

expectations. According to this theory, satisfaction with participants' expectations would make them engage more in the program.

The case of Meiledi Art Center in Nanning, the People's Republic of China, provides a useful background for researching the efficiency of after-school programs, which include music. Leveraging on the rapid economic development and urbanization characteristic of the city in the past decades, Nanning, the capital of Guangxi Zhuang Autonomous Region, has needed various educational services, including arts activities outside the classroom. The Meiledi Art Center has already put itself in the framework of the leader and the provider of music lessons within the given area. Therefore, it offers a number of after-school programs aimed at filling the needs of each age and accomplishment level. Even though the Meiledi Art Center is a center of excellence in music training, little research has captured its efficiency. It is important to know the views of the students who engage in such programs so as to evaluate their effectiveness in providing quality music education to the center.

Nonetheless, several studies have provided evidence of the positive impacts of after-school music programs, while a gap still exists in the literature in terms of how these programs fit the expectations of participants and if this has an impact on their level of satisfaction, especially in the context of non-Western countries such as China (Hedemann & Frazier, 2017). In fact, the majority of past research findings concerning music education after school have been found in Western countries where different cultures are, unlike in China (Hopkins et al., 2017). As in many Asian countries, academic success and formal instructional styles are valued in China; it is, therefore, important to determine whether or not the Chinese attend structured music classes after school, and how such perception affects their outlook towards the program (Rounds & Bradshaw, 2021).

This study focuses on evaluating the effectiveness of after-school music programs at the Meiledi Art Center by examining five key variables that contribute to student satisfaction, including the quality of course content, which measures how well the material aligns with students' learning needs and interests; the effectiveness of teaching methods, assessing the instructional approaches used by educators; the quality of learning methods, reflecting the students' engagement and comprehension strategies; the adequacy of teaching materials, which refers to the availability and relevance of resources provided; and the supportive learning environment, which considers the physical and social setting in which the education takes place. Together, these variables help determine the alignment between student expectations and their overall satisfaction with the program. This paper aims to understand how effective the after-school music training is at the Meiledi Art Center since it seeks to find out whether the program meets the aspirations of its clientele in a way that leads to their satisfaction. On this premise, organized and structured learning and/or recreational activities such as after-school programs, especially those that offer music lessons and activities, have been found to hold several beneficial effects on children and adolescents (Li et al., 2021). Furthermore, engagement in music education induces positive changes in certain mental functions foundational to learning, including memory, attention, and spatial-temporal skills, which significantly affect academic performance among learners (Khoso et al., 2022).

1.1 Research Questions

1) How does the quality of course content at the Meiledi Art Center influence student satisfaction?

2) To what extent do the teaching methods employ in the music program impact student satisfaction?

1.2 Research Hypotheses

H1: There is a positive relationship between the quality of course content and student satisfaction.

H2: The effectiveness of teaching methods positively influences student satisfaction.

H3: The quality of learning methods is positively associated with student satisfaction.

H4: The adequacy of teaching materials positively impacts student satisfaction.

H5: A supportive learning environment enhances student satisfaction.

2. LITERATURE REVIEW

Chinese art has a very long and remote background and is indistinguishable from the progression of China as a nation. Beginning from art customs in the forms of calligraphy and painting, instrument and vocal music, to those present in current-day arts in arts of visual and performing arts, art in China has always been a mirror of societal aesthetics and cultures (Fashola, 1998). Modern Chinese art has been transformed and developed throughout two and half thousand years in historical course affording to outline the corresponding variations of political economy and social condition. Nevertheless, it still has its features and characteristics of Chinese art. As in many other societies of the contemporary world, art remains relevant in education and social evolution in Mainland China, with many art centers and institutions contributing to nurturing talents and promoting arts and culture in China (Chong & Kim, 2010). This was the case in the context of the Meiledi Art Center situated in Nanning, Guangxi Province of China, which forms part of this system of art education in China. Solely driven by the goal of offering students of all ages a superior level of art education the center has grown to be the haven of arts within the region. Music, Visual Art, and Performing Arts are the major classes that are taught in the center and target a wide variety of students' populations and abilities (Olubukola, 2021).

The sponsorship and teaching pattern practiced at the Meiledi Art Center closely relates to the general pattern of Chinese tropical art education, stressing methodology and training mode instructions. This focus is correspondingly compatible with advertisement and the traditional Chinese conception of education, discipline, hard work, and passion for working towards perfection (Zhang et al., 2006). But the center also understands the need to foster imagination and self-identity and tries to address these areas in the curriculum as well. In this way, Meiledi Art Center not only performs as the standard-bearer for traditional Chinese artistic practices but also promotes the development of creativity and the search for new art forms, which makes a major contribution to the development of the cultural potential of Nanning and Farther (Reisner et al., 2004). To this extent, the center has benefited from flexibility that allows it to totally embrace the culture and expectations of the people.

2.1 The Evolution of Art Education in China

Art education in China has undergone significant transformation over the centuries, evolving from traditional methods deeply rooted in Confucian philosophy to more contemporary approaches influenced by global educational practices (Cheng, 2010). Historically, art In China education was largely associated with the imperial examination system whereby calligraphy, poetry, and painting were part of the education of the scholar-official class (Evans, 2001). They were viewed as not only a way to cultivate and refine the self but also a means to prove one's propriety and status. For the next several centuries, ink calligraphy and landscape painting remained the favored mode of expression, as they conveyed the quintessentially Chinese sensibilities of order, symmetry, and reverence for nature (Xiaoguang, 2015). Chinese art education has

undergone some significant changes, especially from the onset of the twentieth century, more so after the formation of the People's Republic of China in 1949.

In the post-Mao period, the Chinese Government started changing its policy regarding art education for children as China started liberalizing and opening up to the world and beginning reforms (Bao, 2022). While in the Soviet period, traditional Chinese art was developed actively, in the 1980s and 1990s, the national art styles breathed their revival, and new styles from the West, as well as new educational approaches to art, appeared (Han, 2022). Education in art academies and schools began to expand its syllabus contents that encompassed Chinese and Western art history, theories, and techniques. Thus, there was an enhancement of the discourse on the necessity for a more wholesome approach to art education (Li et al., 2022). This period also saw a growth of contemporary art in China, with artists and educators growing interested in new media and interdisciplinary practice. It is possible to state that art education in China today can be defined as diverse and rather actively developing. In China, the government has valued the place of art in nurturing creativity and innovation, as well as a cultural consciousness among students (Khoso et al., 2024). Under the reforms in education, art has been included in the curriculum framework at the national level though the teaching-learning resources offer the selections of both traditional and modern Chinese art (Li, 2016).

2.2 Quality of Course Content and Student Satisfaction

The quality of content delivered in courses is relevant to the overall determination of student satisfaction, especially if the content to be delivered in the course should, in one way or the other, enhance the student's academics and or personal development. Relevance, together with depth and the capability of the course content to capture the attention and interest of students, is an important factor in promoting a positive learning environment (Leach, 2019). According to Su (2023), materials that are well-organized and courses that are well-planned facilitate student learning and increase motivation. Further, course contents that are viewed as important and realistic are expected to provide quality that meets the students' expectations; thereby giving high rats for satisfaction (Li et al., 2022). Under the conditions of thinking about music education, the quality of course content is paramount since it has to be tailored for students of different levels, from total novices to the most experienced. In music programs, literature has suggested that satisfaction is improved in the context of course content that is integrated and defined based on different learning styles (Li, 2016). Hence, it is required to balance between the content difficulty level and its retrievability in order to satisfy after school music program participants as high as possible (Han, 2022).

2.3 The Effectiveness of Teaching Methods and Student Satisfaction

Teaching methods involve the mode by which knowledge is delivered, and they have a direct impact on the satisfaction levels of the students, especially where the latter's learning styles may demand some form of integration into the teaching mode used in a given learning institution (Webster, 2012). The views as to what constitutes effective knowledge-delivery processes are those that not only impart knowledge but also get students to participate actively in the processes through which such knowledge is acquired (Wilson, 1997). Teaching approaches that are active and centered on students, including problem-based learning and collaborative projects, have been realized to lead to high student satisfaction. These methods foster ownership of learning by the students, which makes the education process more fulfilling. Since music is a practical subject delivered through hands and fingers, teaching techniques applied to it are rather significant. Research has also indicated that the use of techniques that embrace the conversion of theory into practical practice, including masterclasses, one-to-one coaching or training sessions for ensembles, dramatically

improves students' satisfaction levels (Xiaoguang, 2015). Also, teaching strategies that cater to the learning modalities as well as the learning rate of student will ensure that the students' needs are met fully hence resulting in higher levels of satisfaction (Awang & Ismail, 2010). Hence, there is a need to incorporate a variety and flexible approach to teaching in order to enhance student satisfaction in after-school music classes.

2.4 The Quality of Learning Methods and Student Satisfaction

Learning methods are one of the essential components of educational quality, which is an indicator of the students' satisfaction. Teaching methods include the means, procedures, and processes through which the students acquire, analyze, and apply knowledge. Effective learning processes are those that Xiao and Wilkins (2015) refer to as 'quality enhancement' learning methods. These processes are instructional matches and consistent with the needs of the students to achieve specific educational outcomes. Accordingly, the desire of students to learn in ways that are, on the one hand, optimally conducive to success and, on the other, appealing to favorite learning styles causes the overall satisfaction to grow (Wang, 2012). Studies have also indicated that a combination of effective learning methods, such as active learning, reflective practices, and experiential learning, enhances the satisfaction level of students. For example, the application of active learning in students engages them in tasks that involve constructing meaning from lecture contents, hence increasing student comprehension and recall of information (Astin, 1993). In this vein, reflective practices require the student to evaluate the processes of their learning and monitor progress more closely to produce a greater appreciation of the things done right and the areas that require tweaking to meet satisfaction (Wang et al., 2011).

More specifically, it stands to reason that the quality of the learning methods is especially important in the case of education in musical instrument playing since such learning will principally entail practicing skills that are embedded in the practical art of music-making. Research has shown that students who incorporate various approaches to learning and innovation, including practicing routines, peer learning, and self-grading, have higher satisfaction levels, as found by Liu et al. (2018). For instance, on a regular basis practice of self-assessment enhances the students' monitoring of how far they have progressed, goal setting, and motivation, all of which are essential in making learning more satisfying (Khoso et al., 2022). However, flexibility in approaches adopted in teaching ought to be focused on meeting the needs of individual students in order to meet high levels of satisfaction.

2.5 Adequacy of Teaching Materials and Student Satisfaction

Teaching materials are indicators of satisfaction when it comes to students, especially in a learning system whereby the available materials determine the quality of the learning system in place (Leach, 2019). Teaching aids refer to the resources used by teachers while imparting knowledge and skills, including books, computer and other electronic-based materials, musical instruments, and any other equipment that the teacher may use in the course of lesson delivery. Relevant, accurate, and according to the curriculum, the teaching materials are regarded as of great quality contributing to the learning and understanding processes (Khoso et al., 2022). Thus, when the taught teaching materials are seen as sufficient to support the student learning and help in achieving the learning objectives, the student engagement and satisfaction, the educational experience is likely to be satisfactory (Xiao & Wilkins, 2015).

This has been found to be so through past studies in view of the effectiveness of content relevance in enhancing students' learning and their level of content satisfaction. For instance, Yue (2017) has pointed out that if students are provided with properly developed and contextually relevant learning resources,

students are generally healthier, academically and circumstantially, and more satisfied. This is particularly the case in subjects that involve equipment – music, for example – that the kind of instruments, scores, and other learning aids availed to the learners dramatically skew the learning process (Feng, 2017). To some extent, the availability of tutorial apparatus is highly relevant in music education since it defines the quality of teaching and learning resources available and the opportunities that students get to practice. A number of researches have established that students who enjoy the best teaching aids and instruments are more inclined in their learning activities and contented with their learning processes (Yu et al., 2023).

2.6 A supportive learning environment enhances student satisfaction

Student satisfaction is thus a combination of factors relating to the physical, emotional and social environment which the students encounter in their education system. The literature has demonstrated that students' perceptions of their learning environment as positively stimulating contribute to the student's academic engagement, motivation, and satisfaction with their learning experience (Li et al., 2021). In conclusion, I would like to note that an effective learning environment encompasses facilities and infrastructure, educational resources and instruments in a classroom, and, what is more important, the emotional and perceiving climate, where a student would not feel a failure but would feel secure and appreciated. Policies and place, especially physical aspects tied to the class, accessibility of comfortable space and light, the availability and accessibility of learning resources, and the comfort of the seats all contribute to the satisfaction among the students (James, 2021). For example, research has shown that students in schools with better physical learning environments do well academically as well as exhibit higher satisfaction levels. However, it is just as valid to speak about the emotional and social aspects of the learning environment. Positive affect also predicts favorable attitudes to learning since students supported by their friends and teachers want to engage themselves in the learning process (Rienties et al., 2015).

In the context of music education, a supportive learning environment is particularly crucial because of the collaborative and performance-oriented nature of the subject. Students who feel encouraged and supported by their instructors and peers are more likely to take risks in their learning, which is essential for developing musical skills. Additionally, a supportive environment that promotes positive social interactions can help reduce performance anxiety, leading to a more enjoyable and satisfying learning experience.

2.7 Theoretical Frameworks for Measuring Student Satisfaction in Art Education

To create a robust model for understanding student satisfaction within the context of art education, it is important to incorporate theoretical frameworks that align with the specific characteristics of arts as a subject area. Several established models have been applied in educational settings, including art education, to measure satisfaction. However, for the current study, the most appropriate model to use as the theoretical foundation is the Expectation-Confirmation Theory (ECT) by Oliver (1980). The Expectation-Confirmation Theory posits that satisfaction is determined by the degree to which students' experiences in the program align with or exceed their initial expectations. This model is relevant to the current study as it allows us to examine the gap between what students expect from the after-school music training at the Meiledi Art Center and how they evaluate their actual experiences. If their experiences meet or exceed expectations, satisfaction is likely to be achieved. The five key variables in the research model, quality of course content, effectiveness of teaching methods, quality of learning methods, adequacy of teaching materials, and supportive learning environment, are derived from this theory, as they represent core aspects of student experiences that influence satisfaction.

Although other models, such as the SERVQUAL model by Parasuraman et al. (1988), assess service quality in educational settings, they are not the primary theoretical foundation for this study. However, elements of the SERVQUAL dimensions (e.g., reliability, assurance, and responsiveness) do align with certain aspects of the five variables examined in this study. Similarly, the Self-Determination Theory (SDT) by Deci and Ryan (1985) offers insights into the psychological needs of students, such as autonomy and competence. Still, these elements are indirectly reflected in the overall satisfaction framework rather than forming the basis of the research model.

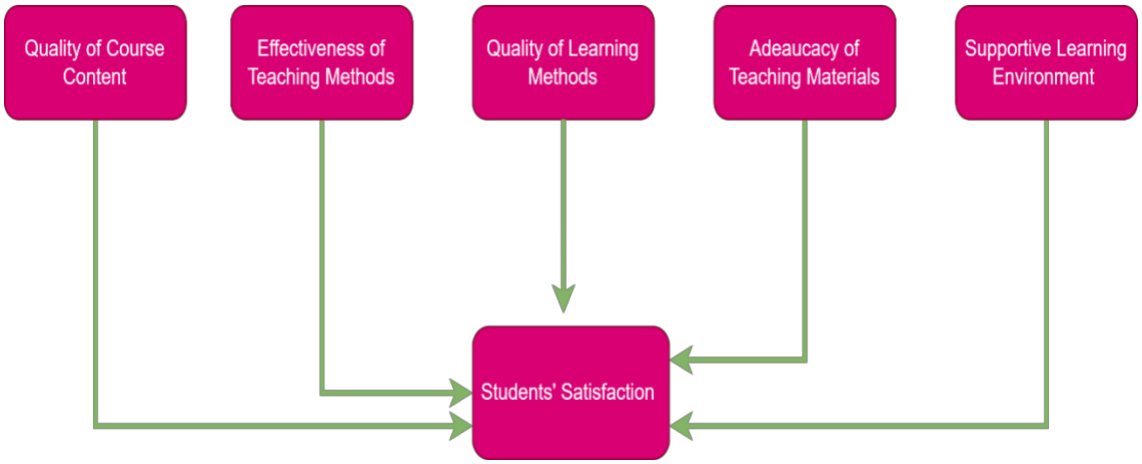

Figure 1: Research Framework

3. METHODOLOGY

3.1 Research Design

The research design employed in this study is a cross-sectional quantitative approach aimed at systematically collecting and analyzing data to understand the relationship between parents' expectations and their satisfaction with after-school music programs at the Meilide Art Center in Nanning, China. This design is particularly suited for capturing the current state of participant satisfaction and identifying key factors that influence it. The study evaluates five core dimensions of the educational experience: course content, teaching methods, learning methods, teaching materials, and the supporting environment. These dimensions were selected based on Total Quality Management (TQM) principles in education, as outlined by Sallis (2002), emphasizing the importance of quality and continuous improvement in educational settings. By employing a structured questionnaire, the study collected quantitative data from a representative sample of students between the ages of 12 to 18 who are enrolled in various music classes at the center. The cross-sectional nature of the design allows for a snapshot analysis of the participants' experiences and perceptions, providing valuable insights into the effectiveness of the after-school programs. This design was chosen for its ability to efficiently gather data from a large population, facilitating the identification of patterns and trends that can inform the development of more targeted and effective educational strategies.

3.2 Research Instrument

The primary instrument used for data collection in this study was a structured questionnaire, carefully designed to measure the expectations and satisfaction of students who are enrolled in after-school music

programs at the Meilide Art Center. The questionnaire was developed to capture a comprehensive view of parents' perceptions across five key dimensions: course content, teaching methods, learning methods, teaching materials, and the supporting environment. These dimensions were selected based on their relevance to Total Quality Management (TQM) in education, as articulated by Sallis (2002), ensuring that the instrument addressed critical aspects of the educational experience. The questionnaire was structured into three distinct sections. The first section focused on gathering basic demographic information about the respondents, including gender, age, and details about their child's class and campus within the Meilide Art Center. This information was essential for understanding the participants' backgrounds and performing subgroup analyses. The second section employed a 5-point Likert scale, ranging from 'strongly disagree' to 'strongly agree,' to assess various facets of the educational experience.

The third section of the questionnaire consisted of multiple-choice questions that sought to elicit detailed feedback on specific aspects of the after-school programs. Including these questions was intended to provide actionable insights that could guide the development of targeted improvements in the center's offerings. To ensure the validity and reliability of the instrument, the questionnaire was initially drafted in Chinese to maintain cultural and linguistic relevance. It was then translated into English for the purposes of this study. A panel of three experts in educational research reviewed the questionnaire, resulting in an Item Objective Congruence (IOC) index ranging between 0.67 and 1.00, indicating high validity and relevance of the items.

3.3 Research Data Collection

Data collection was conducted in Nanning, the capital of Guangxi Zhuang Autonomous Region in China. Nanning was chosen due to its rapid urbanization and increasing demand for diverse educational opportunities, particularly in the arts. The data collection process was carried out online using WenJuanWang (www.wenjuanwang.com) and distributed via WeChat to reach the target sample efficiently. The use of online platforms was chosen for its broad reach and convenience, allowing for the inclusion of a geographically diverse group of respondents within Nanning. Prior to full deployment, a pilot test was conducted with 30 respondents who were not part of the target group to refine the questionnaire and enhance its effectiveness. Of the 300 questionnaires distributed, 217 were returned, yielding a response rate of 72.33%. This high response rate can be attributed to the strategic use of WeChat, a widely-used communication tool in China, facilitating easy access and engagement with the target audience.

Table 1. Response Rate of Data Collection

Description	Value
Total Questionnaires Distributed	300
Total Questionnaires Returned	217
Response Rate (%)	72.33%

Table 2. Reliability of Questionnaire

Dimension	Cronbach's α	Items	Sample
Course Content	0.75	5	30
Teaching Methods	0.78	4	30

Learning Methods	0.72	4	30
Teaching Materials	0.7	3	30
Supportive Learning Environment	0.73	4	30
Overall Questionnaire	0.68	20	30

The reliability of the questionnaire was assessed using Cronbach's alpha, which yielded a value of 0.68, as shown in Table 1. This indicates an acceptable level of internal consistency across the 20 items in the questionnaire, based on a pilot sample of 30 respondents. The Cronbach's alpha value suggests that the questionnaire items are sufficiently reliable for measuring the constructs of interest in this study.

3.4 Sample Size and Sampling

The sample size for this study was determined using the Krejcie and Morgan (1970) formula, which is widely recognized for calculating sample sizes in social science research. For a population of 500 children enrolled in after-school music programs at the Meilide Art Center, a sample size of 217 was deemed appropriate, providing a 95% confidence level with a 5% margin of error. This ensures that the findings are statistically significant to the broader population of the center. A stratified sampling technique was employed to ensure that the sample was representative of the different subgroups within the population. The strata were based on the type of music class (e.g., piano, violin, singing) and the campus location (Qingxiu, Liangqin, and Xingning). To further explain the process of stratified sampling, the number of learners selected from each stratum was determined according to the proportion contributed by a particular category to the total population of 500 students enrolled in after-school music programs at Meilide Art Center.This approach allowed for a more precise understanding of satisfaction levels across various classes and campuses.

3.5 Analysis Method

The data collected as part of this study were examined by means of both descriptive and inferential analysis, and the objectives of this research are as follows: This way, the authors were able to obtain an overall picture of general trends and simultaneously study variations between these subgroups in more detail. Descriptive analysis was employed by summarizing merely mean variations throughout the view of the dataset. In particular, the Mean and Standard Deviation of each item of the questionnaire were computed. The Mean was arrived at to give a central estimate of the level of the responses received, capturing, in essence, the (rounded to the closest whole number) overall agreement or satisfaction among the respondents. The Standard Deviation, on the other hand, was calculated to provide data on the dispersion of the responses and, therefore, show the extent of agreement (or lower) with the Standard Deviation, On this basis, it was possible to see where satisfaction or dissatisfaction was consistent across students and thus compare trends in perceptions easily.

To explore whether statistically significant differences existed in satisfaction levels across various subgroups, inferential analysis was conducted using Analysis of Variance (ANOVA). ANOVA was chosen for its ability to simultaneously compare means across multiple groups, making it ideal for examining differences based on factors such as the type of music class (e.g., piano, violin, singing) and the campus location (Qingxiu, Liangqin, Xingning). This method allowed the study to determine whether variations in satisfaction were due to random chance or if they reflected actual differences between subgroups. The F-value and P-value obtained from the ANOVA tests were critical in assessing the significance of these

differences, guiding the interpretation of the results. To deepen the analysis further, Multi-attribute Utility Analysis was employed to bring out how different attributes valued by students contribute to their satisfaction with the center's offerings. It helped pinpoint key opportunities for improvement, like increasing performance opportunities and expanding the range of instruments available for rental, which directly corresponded to student preferences. A Correlation Analysis was also performed to investigate the relationships between different dimensions of students' expectations and their respective levels of satisfaction. Such analysis has identified the degree of association between major variables like course content, teaching methods, learning methods, teaching materials, and the supporting environment. This gives meaning into how these different elements interact in influencing student satisfaction.

The analysis was performed with the help of computerized statistical software to achieve accuracy in computations and objectivity in assessing the information obtained. This eliminated the likelihood of errors that would be made by man when analyzing large datasets; it also made possible the performance of other complicated statistical procedures such as ANOVA and generally made the study less prone to error. Based on the descriptive and inferential analysis outcomes, the following recommendations were derived and laid down. These recommendations pointed at situations that would be of interest to the center and which can help modify their portfolio to fit the expectations of the students.

3.6 Ethical considerations

The first author distributed the online questionnaires via a survey platform WenJuanWang, with an informed consent form at the beginning of the questionnaire. This informed consent form contained all the information about the purpose of the research, the procedures, the rights of the participants, and the confidentiality measures. We notified the purpose of the survey both to students and parents in advance through the WeChat group before the students started filling out the questionnaires. Informed consent was obtained from the parents on their children's behalf, and the students' permission was based on their parents' consent. Moreover, all data collected were anonymized to protect the identity of participants and guarantee their privacy and security. The study procedures were approved by the department of Bansomdejchaopraya Rajabhat University, Thailand, where this researcher was studying. In this case, the study proposal was subjected to the University Ethical Committee to ensure that all the procedures followed were ethical and met the University’s Ethical Standards.

4. RESULTS AND DISCUSSION

4.1 Demographic Information

The demographic analysis of the study participants provides valuable insights into the characteristics of the student population enrolled in after-school music programs at the Meilide Art Center. The data was collected from 217 students aged between 12 and 18 years, ensuring a focus on adolescents who are at a critical stage in their educational and personal development. The demographic breakdown reveals a nearly equal distribution of male (52.53%) and female (47.47%) students, highlighting a balanced gender representation. Additionally, the analysis categorizes students by age groups, class preferences, class levels, and campus locations, offering a comprehensive view of the student body. This detailed demographic information is crucial for understanding the diverse needs and preferences of the students, enabling more targeted recommendations for enhancing the quality and effectiveness of the music programs. The specifics of this demographic breakdown are presented in Table 3 below.

Table 3. Demographic Information

Question	Item	Frequency	Percentage
Q1 - Gender	Male	114	52.53
	Female	103	47.47
Total	-	217	100.00
Q2 - Age Group	12-14 years	89	41.01
	15-16 years	73	33.64
	17-18 years	55	25.35
Total	-	217	100.00
Q3 - Class	Piano (Male)	67	30.88
	Piano (Female)	54	24.88
	Violin (Male)	24	11.06
	Violin (Female)	28	12.90
	Singing (Male)	23	10.60
	Singing (Female)	21	9.68
Total	-	217	100.00
Q4 - Class Level	Beginner	98	45.16
	Intermediate	79	36.41
	Advanced	40	18.43
Total	-	217	100.00
Q5 - Campus	Qinxiu District	120	55.30
	Xinning District	60	27.65
	Liangqin District	37	17.05
Total	-	217	100.00

4.2 Descriptive Analysis

Table 4 presents the mean and standard deviation of students' expectations and satisfaction levels across five dimensions related to their educational experience, along with an overall rating. The dimension with the highest mean of 4.28 and a standard deviation of 0.66 is the "Supporting Environment", indicating the highest satisfaction level. This is followed by "Course Content," with a mean of 4.26 and a standard deviation of 0.65. The next highest is the "Teaching Method," with a mean of 4.25 and a standard deviation of 0.66. "Teaching Material" has the same mean of 4.25 but a slightly higher standard deviation of 0.68. Finally, the "Learning Method" has the lowest mean of 4.21 with a standard deviation of 0.67. The overall mean across all dimensions is 4.25, with a standard deviation of 0.66, suggesting an overall "Satisfied" level.

Table 4. The Students' Expectations and Satisfaction in Five Dimensions

Dimension	Mean	S.D.	Level	Rank
Course Content	4.26	0.65	Satisfied	2
Teaching Method	4.25	0.66	Satisfied	3
Learning Method	4.21	0.67	Satisfied	5

Dimension	Mean	S.D.	Level	Rank
Teaching Material	4.25	0.68	Satisfied	4
Supporting Environment	4.28	0.66	Satisfied	1
Overall	4.25	0.66	Satisfied	

4.3 Differential Analysis

Table 5 presents an Analysis of Variance (ANOVA) comparing the satisfaction across various dimensions of a music class, broken down by the type of class: Piano, Singing, and Violin. Each dimension includes frequency, mean, standard deviation, F-value, and P-value for each option, along with a total that aggregates all options. Overall, the ANOVA analysis predominantly shows no significant differences in student satisfaction across different class types for most dimensions except for a marginal significance in the learning method, which favors singing classes.

Tables 5. ANOVA for Class

Dimension	Option	Frequency	Mean	S.D.	F	P
Course Content	Piano	121	4.26	0.63	0.52	0.597
	Singing	44	4.30	0.76		
	Violin	52	4.24	0.57		
	Total	217	4.26	0.65		
Teaching Method	Piano	121	4.23	0.63	0.52	0.594
	Singing	44	4.28	0.65		
	Violin	52	4.27	0.68		
	Total	217	4.25	0.66		
Learning Method	Piano	121	4.20	0.67	2.73	0.068
	Singing	44	4.32	0.70		
	Violin	52	4.16	0.67		
	Total	217	4.21	0.69		
Teaching Material	Piano	121	4.24	0.74	0.77	0.464
	Singing	44	4.21	0.66		
	Violin	52	4.3	0.61		
	Total	217	4.25	0.68		
Supporting Environment	Piano	121	4.30	0.67	2.94	0.055
	Singing	44	4.32	0.64		

Dimension	Option	Frequency	Mean	S.D.	F	P
	Violin	52	4.18	0.62		
	Total	217	4.27	0.66		

Table 6 presents an Analysis of Variance (ANOVA) to compare student satisfaction across various dimensions of educational experience, segmented by campus location: Qingxiu, Liangqin, and Xingning. The analysis includes data on frequency, mean scores, standard deviations, F-values, and P-values for each campus option, including overall totals. Overall, the ANOVA analysis across all dimensions demonstrates that there are no statistically significant differences in student satisfaction between the campuses for any of the evaluated educational aspects, indicating a consistent quality of experience across locations.

Table 6. ANOVA for Campus

Dimension	Option	Frequency	Mean	S.D.	F	P
Course Content	Qingxiu	120	4.26	0.63	2.18	0.115
	Liangqin	37	4.35	0.76		
	Xingning	60	4.21	0.57		
	Total	217	4.26	0.65		
Teaching Method	Qingxiu	120	4.23	0.63	0.62	0.538
	Liangqin	37	4.26	0.65		
	Xingning	60	4.29	0.68		
	Total	217	4.25	0.66		
Learning Method	Qingxiu	120	4.20	0.67	0.41	0.666
	Liangqin	37	4.26	0.70		
	Xingning	60	4.22	0.67		
	Total	217	4.21	0.69		
Teaching Material	Qingxiu	120	4.24	0.74	0.16	0.854
	Liangqin	37	4.24	0.66		
	Xingning	60	4.27	0.61		
	Total	217	4.25	0.68		
Supporting Environment	Qingxiu	120	4.28	0.67	1.23	0.293
	Liangqin	37	4.34	0.64		
	Xingning	60	4.23	0.62		
	Total	217	4.27	0.66		

Table 6 presents the results of an Analysis of Variance (ANOVA) conducted to compare satisfaction levels across different campuses, Qingxiu, Liangqin, and Xingning, for various dimensions of the educational experience at the Meilide Art Center. The analysis shows that, for the "Course Content" dimension, the mean satisfaction scores were 4.26 for Qingxiu, 4.35 for Liangqin, and 4.21 for Xingning. The associated F-value of 2.18 and a P-value of 0.115 indicate that there are no statistically significant differences in satisfaction with course content across these campuses. Similarly, for the "Teaching Method" dimension, the mean scores ranged from 4.23 in Qingxiu to 4.29 in Xingning, with an F-value of 0.62 and a P-value of 0.538, again suggesting no significant differences in satisfaction levels among the campuses.

For the "Learning Method" dimension, the mean scores were fairly consistent across the campuses, with Qingxiu at 4.20, Liangqin at 4.26, and Xingning at 4.22, yielding an F-value of 0.41 and a P-value of 0.666, which further confirms the lack of significant variation in satisfaction. The "Teaching Material" dimension also showed little difference in satisfaction, with mean scores of 4.24, 4.24, and 4.27 for Qingxiu, Liangqin, and Xingning respectively, and an F-value of 0.16 and a P-value of 0.854. Finally, for the "Supporting Environment" dimension, mean scores were slightly higher for Liangqin (4.34) compared to Qingxiu (4.28) and Xingning (4.23), but the F-value of 1.23 and a P-value of 0.293 indicate that these differences are not statistically significant. Overall, the ANOVA results suggest that satisfaction levels across the different campuses are fairly consistent, with no significant variations observed in any of the educational dimensions analyzed.

4.4 Multi-attribute Utility Analysis

Table 7 reveals opportunities to enhance the Meiledi Art Center's offerings based on student preferences. Top implications include increasing performance opportunities, enhancing digital infrastructure and recreational facilities, providing more diverse instrument rentals, rehearsal sessions, and student-organized performances, offering new courses/activities for the Chinese zither, drumming, and harmonica, facilitating summer camps by renowned musicians, performance/exchange events, and competitions, while continuing to prioritize quality teaching staff, leveraging word-of-mouth recommendations, and maintaining affordable tuition fees which were key reasons for choosing the institute. Implementing the top three desired additions for each area can drive improvements in learning experiences, campus amenities, performance development, and overall satisfaction aligning with attendee needs and interests.

Table 7. Recommendations

Q26-What type of additional resources or facilities would enhance your learning experience? (Choose more than one answer)

Options	Frequency	Percentage
* More practice rooms	114	52.53%
* Access to online learning materials	134	61.75%
*Workshops or masterclasses	95	43.78%

* Performance opportunities	144	66.36%
* One-on-one tutoring sessions	108	49.77%
* Enhanced library or multimedia resources	68	31.34%
* Forming music bands	28	12.90%
Total	217	

Q27-What type of additional campus facilities would enhance your experience?" (Choose more than one answer.)

Options	**Frequency**	**Percentage**
* Enhanced digital infrastructure (Wi-Fi, computer labs)	147	67.74%
* More recreational areas (e.g., sports facilities, game rooms)	127	58.53%
* Improved cafeteria or food services	109	50.23%
* Additional study areas or quiet zones	90	41.47%
* More parking space or better transportation access	52	23.96%
Total	217	

Q28-What improvements would you suggest for the performance events? (Choose more than one answer)

Options	**Frequency**	**Percentage**
* Enhanced stage and audio-visual equipment	87	40.09%
* More frequent rehearsal sessions prior to the event	121	55.76%
* More engagement for student to organize performances	120	55.30%
* More diverse types of musical instrument rental	136	62.67%
* The opportunity to collaborate and perform with higher-level	67	30.88%
Total	217	

Q29-Would you be interested in additional courses or activities if offered? (Choose more than one answer)

Options	**Frequency**	**Percentage**

* Guitar	78	35.94%
* Drum set	100	46.08%
* Harmonica	97	44.70%
* Guzheng (Chinese zither)	112	51.61%
* Suona (Chinese horn)	73	33.64%
* Erhu (Chinese two-stringed fiddle)	35	16.13%
Total	217	

Q30-Which of the following would you be willing to spend more money or time on purchasing or participating in? (Choose more than one answer)

Options	**Frequency**	**Percentage**
* Musical instruments and related accessories	84	38.71%
* Competitions (involving training fees, registration fees, etc.)	131	60.37%
* Performances or exchange salons (involving training fees, registration fees, etc.)	140	64.52%
* Summer (winter) camps by renowned musicians Suona (Chinese horn)	142	65.44%
* Master classes	52	23.96%
* Grading test	23	10.60%
Total	217	

Q31-What are reasons for choosing the institute? (Choose more than one answer.)

Options	**Frequency**	**Percentage**
* Reputation of the institute	64	29.49%
* Quality of teaching staff	125	57.60%
* Recommendations from friends or family	111	51.15%
* Proximity to home or work	100	46.08%
* Affordable tuition fees	103	47.47%

* Availability of performance opportunities	88	40.55%
* Payment method	34	15.67%
* Other reasons.	2	0.92%
Total	217	

4.5 Correlation Analysis

A correlation analysis was conducted to explore further the relationships between the various dimensions of students' expectations and satisfaction levels. This analysis examined the degree of association between key variables such as course content, teaching methods, learning methods, teaching materials, and the supporting environment.

Table 8. Correlation Matrix

Variable	1	2	3	4	5
Course Content	1	0.65**	0.60**	0.58**	0.63**
Teaching Method	0.65**	1	0.66**	0.64**	0.68**
Learning Method	0.60**	0.66**	1	0.62**	0.61**
Teaching Material	0.58**	0.64**	0.62**	1	0.60**
Supporting Environment	0.63**	0.68**	0.61**	0.60**	1

Table 8 presents the correlation matrix for the key variables in the study: course content, teaching methods, learning methods, teaching materials, and supportive learning environment. The correlation coefficients indicate strong, positive relationships between all variables, with values ranging from 0.58 to 0.68. All correlations are statistically significant at the 0.01 level, as denoted by the ** symbol, which indicates highly significant results. The consistent positive correlations suggest that improvements in one area, such as course content or teaching methods, are associated with improvements in others, reflecting the interconnected nature of these dimensions in contributing to student satisfaction.

4.6 Hypothesis Testing

Table 9. Hypothesis Testing Results

Hypothesis	Path	Beta (β)	Standard Error	t-value	p-value	Result
H1	Course Content -> Satisfaction	0.42	0.08	5.25	0.00	Supported
H2	Teaching Method -> Satisfaction	0.38	0.07	5.43	0.00	Supported
H3	Learning Method -> Satisfaction	0.36	0.09	4.00	0.001	Supported
H4	Teaching Material -> Satisfaction	0.34	0.1	3.4	0.001	Supported

H5	Supporting Environment -> Satisfaction	0.44	0.06	7.33	0.00	Supported

The results of the hypothesis testing, as shown in Table 8, indicate that all hypotheses are supported with significant positive relationships between the key variables and student satisfaction. The strongest relationship was found for the impact of the supporting environment on student satisfaction ($\beta = 0.44$, $p < 0.001$), confirming the importance of a conducive environment in enhancing the overall effectiveness of the after-school music programs at the Meilide Art Center.

4.7 Discussion

The results of this study proved the helpfulness of after-school music training for students in Meiledi Art Center in Nanning, China, and made clear the correspondence of programs in students' expectations and satisfaction. The final section of the dissertation will entail discussing the observed data with reference to previous theories and research to make sense of the findings with reference to the existing literature and scholarship in the field of music education. Regarding students' distributions by gender and age, it was established that; The numbers of males and females were almost equal; however, as for the age line, students ranked between 12 to 18 years. This demographic diversity is essential in explaining the differentiated demands and expectations that students have towards their extracurricular music instruction. Prior studies have provided a secret of various demographic variables to the educational outcomes and satisfaction. For instance, Jiang et al. (2020) established that gender and age are factors that affect learning preferences and participation in music learning among students. These observations are supported by Meiledi Art Center's findings, especially regarding the gender distribution of students across the class preferences (for example, piano class, violin class, and singing class). That more than half of the students opted for piano classes proves that the tendency in music education throughout the world is to make piano an obligatory kind of class for students, stating that piano is the best kind of class for the general development of musical skills (Zhang et al., 2011).

The descriptive analysis of student satisfaction for each of the five aspects of their educational experience: the Supporting Environment, Course Content, Teaching Method, Teaching Material, and Learning Method revealed high mean scores for students' contentment. The "Supporting Environment" element has the highest mean score, reflecting the fact that the students appreciate the environmental conditions and facilities of the Meiledi Art Center. This finding aligns with the scholarly approaches to TQM in education, which emphasize the importance of a favorable environment for the improvement of the quality of education offered and its correlated influence on the satisfaction of the students (Sallis, 2002). That this result is in consonance with TQM principles points to the fact that the Meiledi Art Center has developed an environment that facilitates learning, which is a key tenet of learning with support from (Na et al., 2024). Previous work, including that of Huijun and Halabi (2023), has argued for an ability to teach students according to their learning style preferences. Thus, the lower satisfaction with learning methods at Meiledi Art Center could be explained by the necessity for more individual or diverse approaches to the teaching-learning process, which is one of the concerns that has been raised in the area of music education (Li, 2016).

The differential analysis, especially when accompanied by a comparison of the means of the different class types and campuses offered in Table 5, added more detail to the evaluation of the level of student satisfaction. The analysis revealed that the respondents did not differ greatly in most of the dimensions of

satisfaction, which can only mean that the students' quality experience is not determined by the type of music class or campus they attend. However, as the results available for the "Learning Method" and "Supporting Environment" demonstrated marginal significance in favor of singing classes and the Liangqin campus, these differences seem to be associated with the peculiarities of these classes or campus. This supports Xiaomin & Jie (2019) that it is still important to consider specific circumstances of music education: the type of instrument given to the student or the environment he or she is learning in. The higher satisfaction level in singing courses could be as a result of the fact that singing is more social and involves student expression more than dancing (Yang & Heong, 2024).

Furthermore, the multi-attribute utility analysis results showed the fields that might be of interest to the Meiledi Art Center in terms of development. All the identified needs, such as performance engagements, better IT facilities, and Instrument rental, show the ever-growing needs of the students in the education sector. This finding aligns with more recent studies indicating the affordances of new technologies with performance-based learning in music education (Feng & Peng, 2024). The desire for better facilities and performance opportunities also relates to the idea of a 'musicians' identity (He, 2022).

The results of the hypothesis testing provide even more evidence of the complex link between the quality of music education and students' satisfaction in Meiledi Art Center. All the hypotheses, one of which focused on the fact that the satisfaction level of students depends on the content of the course, the method of teaching, the method of learning, the teaching/learning aid, and the support environment, were answered statistically/probabilistically. Surprisingly, the impact of the most effective constructs were all rated very high, as seen through their higher means in the descriptive analysis, especially the supporting environment construct, which was nailed with the strongest prediction value of the student's satisfaction. This means that the physical atmosphere and facilities that accommodate education have a very important effect on education according to the TQM principle of education as postulated by Sallis (2002). These views are similar to observations sourced from Huijun and Halabi (2023) and Li (2016) under which educational approaches in teaching music need to be elastic to capture preferences in learning. This confirms the fact that Meiledi Art Center should continue to find ways to improve its teaching techniques and embrace more unique or individual teaching methods to improve students' satisfaction.

5. CONCLUSION AND RECOMMENDATIONS

This study has provided a deeper understanding of the effectiveness of after-school music training at the Meiledi Art Center in Nanning, China, specifically examining the relationship between student expectations and satisfaction. The results reveal that the Supporting Environment had the highest satisfaction rating, indicating the importance of a conducive physical and social atmosphere for enhancing student experiences. This underscores the need for continued investment in improving the learning environment, as it plays a crucial role in student satisfaction.

Additionally, while satisfaction levels were generally high, the findings highlight areas for improvement, particularly in the Learning Methods dimension, which received relatively lower satisfaction ratings. This suggests the need to incorporate more diverse and individualized teaching approaches that cater to students' different learning preferences, as supported by previous research in music education. The study also identified students' desires for more performance opportunities, enhanced digital resources, and access to a wider range of instruments, reflecting the evolving expectations of learners in the modern educational context. In line with other studies, the research confirms that factors

such as the quality of course content, teaching methods, learning methods, teaching materials, and supportive environment are central to student satisfaction. The Meiledi Art Center can continue refining its after-school music programs by addressing these key factors and aligning them with student expectations. These findings offer valuable insights for the Meiledi Art Center and similar educational settings, providing recommendations for enhancing student satisfaction in music education both in China and globally.

Despite the valuable insights gained, this study has several limitations. First, the sample was restricted to students aged 12 to 18 years, excluding other age groups that might also benefit from the music programs, limiting the generalizability of the results across all age groups. Additionally, the study was conducted at a single institution within Nanning, China, which restricts the applicability of the findings to other regions or educational settings with different cultural and social contexts. Methodologically, the reliance on self-reported data may introduce biases such as social desirability or recall bias, potentially impacting the accuracy of the findings.

5.1 Practical Implications

This study's findings have several practical applications for the Meiledi Art Center and other institutions that have after-school music programs. First of all, record high levels of satisfaction in relation to the‘’ Supporting Environment’’ dimension call for the need to continue improving and sustaining the physical and social environment of the Center. Such a center as the Meiledi Art Center should keep on providing finances for the improvement of the facilities so that they can even be more appropriate for learning and creation. This concerns not only the preservation of such status but also the search for the possibilities of the development and modernization of the infrastructure, for example, by expanding and improving the information and technical facilities and other areas of interest for the students. Yet another important consequence concerns the call for individualizing and varying approaches to teaching-learning practices – uneven as the findings for the “Learning Method” sub-indexes were significantly lower than the combined mean of all the five categories. In their practices, the center should refer to the idea of a diverse learning of students and, therefore, use flexible methods of instruction.

The study also sees performance opportunity as a crucial component in the education learning process. Thanks to the fact that a large portion of students expressed their wish to have more often and diverse performances, the Meiledi Art Center has a unique chance to expand its repertoire with more fancy recitals, concerts, and performances. Not only do such events afford students relevant ‘work experience’, but they also assist in building up their confidence and instilling a greater passion and interest in their musical pursuits. More performance experiences could also be as a strong selling point to the center, coupled by an overall improved reputation in the community. Furthermore, since the students’ perception of their overall satisfaction is slightly lower in classes where singing is offered, it can be assumed that maybe there are certain components of the singing classes that students find more appealing.

6. LIMITATIONS AND FUTURE STUDIES

It is important to acknowledge several limitations of this study, which aimed to understand the effectiveness of after-school music programs at the Meiledi Art Center. First, the study was conducted in a single institution within Nanning, China, which limits the generalizability of the findings to other regions, institutions, or cultural contexts. The results may not directly apply to other schools or universities with different social, economic, or cultural settings. Future research should consider expanding the study across

multiple institutions in different regions of China or even internationally to validate whether the observed trends are consistent in diverse educational settings, thereby offering a more comprehensive understanding of after-school music education. Additionally, the study focused on a relatively narrow age group of 12 to 18 years, which excludes younger or older students who might also participate in music programs. This age restriction limits the scope of the findings to adolescents, potentially overlooking how different age groups experience and benefit from such programs. Furthermore, the study did not account for the academic grade level of students, which could influence their engagement and satisfaction with the music programs. Future research should aim to include a broader range of age groups and consider the impact of academic grade levels on student outcomes.

Future research should include other ways of data collection like observation of the classes, interviewing of the teachers, or an evaluative criterion for assessing the improvement to increase the validity of the conclusions regarding the efficacy of the music programs. The study also used cross-sectional data, and this restricted its assessment of the remote learning effects of the performed music programmes on students. Further research that would focus on following students and the changes in student outcomes and satisfaction would be useful in determining the dynamics of these aspects of the program and the effect of continued exposure to the music programs on education. It could also investigate long term impact of learning and performing in after school musical activities on students' academic performance, character transformation and further trainings or careers in music and related professions.

Furthermore, while identifying five dimensions of educational experience, namely, Supporting Environment, Course Content, Teaching Method, Teaching Material, and Learning Method, the study might have omitted other factors that could have influenced student satisfaction. Further research might consider other possible dimensions, which could be school peer relations, involvement, or the effect of after-school activities on the overall schooling process of children. Extending the study in such a manner could bring more extended insight into the nature of what determines the satisfaction of the students in after-school music programs.

Acknowledgements: We are thankful to the anonymous reviewers for their comments on the manuscript.
Author contributions: All authors equally contributed to this study
Ethical Statement: Informed consent was obtained from the students and their parents before the data collection. Moreover, all data collected were anonymized to protect the identity of participants and guarantee their privacy and security. The procedures of the study were approved by the department of Bansomdejchaopraya Rajabhat University, Thailand, where this researcher was studying. In this case, the study proposal was subjected to the University Ethical Committee to ensure that all the procedures followed were ethical and met the University's Ethical Standards.
Consent to Participate: Before conducting this research study, the researcher has obtained permission from the Department of Bansomdejchaopraya Rajabhat University, Thailand. The researcher explained the objectives of the study before collecting the data. The respondents were assured that the information

would only be used for research purposes. The respondents were told that they could withdraw at any stage from the interview if they felt uneasy or did not want to continue the interview.

Competing Interests: The author declares that this work has no competing interests.

Grant/Funding information: The author declared that no grants supported this work.

Data Availability Statement: The associated data is available upon request from the corresponding author.

Declaration Statement of Generative AI: The authors of this manuscript have not used any AI tool except Grammarly for creating this manuscript.

REFERENCES

Astin, A. W. (1993). An empirical typology of college students. *Journal of College Student Development, 34*(1), 36–46.

Awang, H., & Ismail, N. (2010). Undergraduate education: A gap analysis of students' expectations and satisfaction. *Problems of Education in the 21st Century*, *21*, 21.

Bao, L. (2022). Research on the current development state of traditional cultural education in China. *In Chinese Research Perspectives on Educational Development, Vol. 6* (pp. 269-289). Brill.

Cheng, Y. L. (2010). *Learning from the West: The development of Chinese art education for general education in the first half of 20th century China* (Doctoral dissertation, University of Southern Queensland).

Chong, H. J., & Kim, S. J. (2010). Education-oriented music therapy as an after-school program for students with emotional and behavioral problems. *The Arts in Psychotherapy, 37*(3), 190-196.

Creech, A., Hallam, S., Varvarigou, M., McQueen, H., & Gaunt, H. (2013). Active music making: A route to enhanced subjective well-being among older people. *Perspectives in Public health*, *133*(1), 36-43.https://doi.org/10.1177/1757913912466950.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. Springer Science & Business Media.

Evans, L. J. (2001). *A history of art education in the elementary and middle schools of the People's Republic of China, 1949–1989: Political currents and influences in visual-arts education*. The Ohio State University.

Fashola, O. S. (1998). *Review of extended-day and after-school programs and their effectiveness* (Report No. 24). Center for Research on the Education of Students Placed At Risk, Baltimore, MD.

Feng, Y. (2017). *A study of university students' attitudes towards contemporary music in Guangxi Arts University in Nanning, China* (Doctoral dissertation, University of Malaya).

Feng, Y., & Peng, J. (2024). Transformation of educational introspection: Evaluation of the current situation and development of basic music education in China. *Trans/Form/Ação, 47*, e02400169.

General Office of the Central Committee of the Communist Party of China and the General Office of the State Council. (2020, October 15). *Opinions on comprehensively strengthening and improving school physical education and aesthetic education in the new era*. Ministry of Education of the People's

Republic of China. http://www.moe.gov.cn/jyb_xwfb/s6052/moe_838/202010/t20201015_494794.html

Han, X. (2022). The importance of aesthetic ability in arts education: A case study of undergraduate students of universities in Chengdu City of Sichuan Province China. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.4175880

He, Y. (2022). *Graduates' employability in the creative industry in China: What competencies, qualities, and skills Chinese graduates with an undergraduate degree in Fine Art need for employment in China* (Doctoral dissertation, University for the Creative Arts).

Hedemann, E. R., & Frazier, S. L. (2017). Leveraging after-school programs to minimize risks for internalizing symptoms among urban youth: Weaving together music education and social development. *Administration and Policy in Mental Health and Mental Health Services Research, 44*, 756-770.

Hopkins, M., Provenzano, A. M., & Spencer, M. S. (2017). Benefits, challenges, characteristics and instructional approaches in an El Sistema inspired after-school string program developed as a university–school partnership in the United States. *International Journal of Music Education, 35*(2), 239-258.

Huijun, C., & Halabi, K. N. M. (2023). Cultivating of emotional teaching value to art design undergraduate students' aesthetic ability in China. *International Journal of Academic Research in Progressive Education and Development, 12*(1).

James, P. C. (2021). What determines student satisfaction in an e-learning environment? A comprehensive literature review of key success factors. *Higher Education Studies, 11*(3), 1-9.

Jiang, Q., Yuen, M., & Horta, H. (2020). Factors influencing life satisfaction of international students in Mainland China. *International Journal for the Advancement of Counselling, 42(4)*, 393-413.

Khoso, A. K., Darazi, M. A., Mahesar, K. A., Memon, M. A., & Nawaz, F. (2022). The impact of ESL teachers' emotional intelligence on ESL students' academic engagement, reading and writing proficiency: mediating role of ESL students' motivation. *International Journal of Early Childhood Special Education, 14*, 3267-3280.

Khoso, A. K., Khurram, S., & Chachar, Z. A. (2024). Exploring the effects of embeddedness-emanation feminist identity on language learning anxiety: A case study of female English as a foreign language (EFL) learners in higher education institutions of Karachi. *International Journal of Contemporary Issues in Social Sciences, 3*(1), 1277-1290.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement, 30*(3), 607-610.

Leach, T. (2019). Satisfied with what? Contested assumptions about student expectations and satisfaction in higher education. *Research in Post-Compulsory Education, 24*(2-3), 155-172.

Li, M., Chin, C. H., Li, S., Wong, W. P. M., Thong, J. Z., & Gao, K. (2022). The role of influencing factors on brand equity and firm performance with innovation culture as a moderator: a study on art education firms in China. *Sustainability, 15*(1), 519.

Li, S. (2016). *Social media study of an art education program: A case study of China Arts Foundation International* (Master dissertation, university of Oregon).

Li, Z. H. O. U., Shaofeng, T. A. N., & Yan, H. U. A. N. G. (2021). Research on the cultural life changes of pre-school education graduates from secondary vocational schools in Guangxi and its

enlightenment from the perspective of microscopic history. *Journal of Sociology and Ethnology*, 3(5), 66-76.

Liu, J. L., & Zhao, G. D. (2018, July). The measurement and determinants of student satisfaction of education informatization in Chinese universities. In 2018 International Symposium on Educational Technology (ISET) (pp. 183-187). *IEEE*.

Ministry of Education of the People's Republic of China. (2014, January 10). *Several opinions on promoting the development of arts education in schools. No. Jiao Ti Yi [2014].* https://www.gov.cn/gongbao/content/2014/content_2667617.htm

Na, M., Jill, L. S. S., Noor, H. M., Qi, F. J., & Ying, W. (2024). A pre-service art teacher digital literacy framework for digital literacy in pre-service art teacher education in China. *Asian Journal of University Education, 20*(2), 235-247.

Oliver, R. L. (1980). A cognitive model of the antecedents and consequences of satisfaction decisions. *Journal of Marketing Research, 17*(4), 460-469.

Olubukola, O. J. (2021). After-school musical training for students in tertiary institutions in Nigeria: An evaluation of ESM summer camp in Mountain Top University. Awka *Journal of Research in Music and Arts (AJRMA)*, 15.

Provenzano, A. M., Spencer, M. S., Hopkins, M., Ellis, J., Reischl, C. H., Karr, K., & Savas, S. A. (2020). Effects of a university–school partnered after-school music program on developmental health, social, and educational outcomes. *Journal of the Society for Social Work and Research, 11*(3), 443-462.

Reisner, E. R., *White, R. N., Russell, C. A., & Birmingham, J. (2004). Building quality, scale, and effectiveness in after-school programs: Summary report of the TASC evaluation*. Policy Studies Associates, Inc.

Rienties, B., Li, N., & Marsh, V. (2015). *Li, N., Marsh, V., & Rienties, B. (2016). Modelling and managing learner satisfaction: Use of learner feedback to enhance blended and online learning experience. Decision Sciences Journal of Innovative Education, 14(2), 216-242.* https://doi.org/10.1111/dsji.12096

Rounds, M., & Bradshaw, J. (2021). *Golden Opportunity: The impact of the Opportunity Music Connections after school music enrichment program on student outcomes*. Vanderbilt University.

Sallis, E. (2002). *Total Quality Management in Education (3rd ed.)*. Routledge. https://doi.org/10.4324/9780203417010

State Council General Office. (2015). *Opinions on comprehensively strengthening and improving aesthetic education in schools (Document No. 2015/71)*. http://www.moe.gov.cn/jyb_xxgk/moe_1777/moe_1778/201509/t20150928_211095.html

Su, Y. (2023). The present situation of music education in China: Knowledge maps and visualization analysis. *Advances in Education, Humanities, and Social Science Research, 7*(1), 114-114.

Wang, F., Huang, X., Zeb, S., Liu, D., & Wang, Y. (2022). Impact of music education on mental health of higher education students: Moderating role of emotional intelligence. *Frontiers in Psychology, 13*, 938090.

Wang, Q., Taplin, R., & Brown, A. M. (2011). Chinese students' satisfaction of the study abroad experience. *International Journal of Educational Management, 25*(3), 265-277.

Wang, Y. (2012). *University student satisfaction in Shijiazhuang, China: An empirical analysis* (Doctoral dissertation, Lincoln University).

Webster, R. (2012). Challenging student satisfaction through the education of desires. *Australian Journal of Teacher Education (Online), 37*(9), 81-92.

Wilson, B. (1997). *Wilson, B. (1997).* The quiet evolution: Changing the face of arts education. *The Getty Education Institute for the Arts.*

Xiao, J., & Wilkins, S. (2015). The effects of lecturer commitment on student perceptions of teaching quality and student satisfaction in Chinese higher education. *Journal of Higher Education Policy and Management, 37*(1), 98-110.

Xiaoguang, L. I. (2015). Relationship between arts education course system of advanced normal university and arts course of middle school in China as well as an international comparative study. *Cross-Cultural Communication, 11*(9), 19-23.

Xiaomin, G., & Jie, H. (2019). Development and spatial evolution of art exhibitions in Shanghai during the Republic of China (1912-1929). *In City: Spaces of Communication. Proceedings of the 24th Inter-University Symposium on Asian Megacities* (pp. 299-310).

Xinhua News Agency. (2017, October 18). *Xi Jinping represents the 18th Central Committee in reporting to the Congress*. https://www.gov.cn/zhuanti/2017-10/18/content_5232761.htm

Yang, Y., & Heong, Y. M. (2024). The significance of developing advanced higher-order thinking skills in China's arts education. *Journal of TVET and Technology Review, 2*(1), 28-37.

Yu, Q., Jiang, Z., Gao, Y., & Ai, Y. (2023). Research on the status and countermeasures of after-school extended hours service in Yunnan primary schools: Zhaotong City as an example. *Transactions on Economics, Business and Management Research, 3*, 135-141.

Yue, F. (2017). *A study of university students' attitudes towards contemporary music in Guangxi Arts University in Nanning, China* (Master's thesis, University of Malaya).

Yun, G. K. (2011). *The effects of a movement-based after-school music program on music underachievers' musical achievement, social development, and self-esteem* (Doctoral dissertation, Arizona State University).

Zeithaml, V. A., Berry, L. L., & Parasuraman, A. (1988). Communication and control processes in the delivery of service quality. J*ournal of Marketing, 52*(2), 35-48.

Zhang, H., Foskett, N., Wang, D., & Qu, M. (2011). Student satisfaction with undergraduate teaching in China—A comparison between research-intensive and other universities. *Higher Education Policy, 24*, 1-24.

Zhang, J. J., Lam, E. T., Smith, D. W., Fleming, D. S., & Connaughton, D. P. (2006). Development of the scale for program facilitators to assess the effectiveness of after school achievement programs. *Measurement in Physical Education and Exercise Science, 10*(3), 151-167.

Publisher's Note: All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations or the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim made by its manufacturer, is not guaranteed or endorsed by the publisher.

Vol.3, Issue.3, (2024)
Journal of Advances in Humanities Research
https://doi.org/10.56868/jadhur.v3i3.236

Exploring the Nexus of Students' Happiness at School: The Moderating Effect of Student Engagement

Ruibin Gao[1], Qingqing Shi[2], Haipeng Wu[3*]

1. Department of Educational Administration, Southeast Asia University, P.R China
2. Department of Business Management, Jinzhong College of Information, P.R China
3. Department of Educational Administration, Southeast Asia University, P.R China

Article Information

Article Type: Research Article

Dates:
Received: 15 July 2024
Revised: 28 August 2024
Accepted: 07 September 2024
Available online: 14 September 2024

Copyright:
This work is licensed under creative common licensed ©2024

Corresponding Author: Haipeng Wu
813363471@qq.com

ABSTRACT

This study investigates the relationships between school climate, students' well-being, participation in educational activities, and students' happiness at school, focusing on the moderating role of student engagement. Using a quantitative cross-sectional survey, data were gathered from 164 high school students in Shanghai, China. The constructs were measured with validated instruments, and data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM). The results show that school climate, student well-being, and participation in educational activities all have strong, positive relationships with students' happiness. Furthermore, student engagement significantly moderates these relationships, strengthening the positive effects of school climate, well-being, and participation on students' happiness. Higher levels of student engagement were found to enhance the impact of a supportive school environment, personal well-being, and active participation in educational activities, leading to increased student happiness. These findings emphasize the critical role of student engagement in maximizing the benefits of a positive school climate and well-being programs. The study offers important implications for educators and policymakers, suggesting that strategies to promote engagement can significantly improve students' happiness and overall school experience. Future research should explore these dynamics across various educational settings to further validate and expand upon these results.

Keywords: Happiness, Student Engagement, School Climate, Wellbeing, Student Participation

1. INTRODUCTION

The concept of happiness in schools is relatively new and schools have recently been praised for signing up students to happiness. It can cover aspects of their subjective experience, including outlook on life, emotions, attitudes towards learning, and learning context. It has been recommended that school happiness promotes positive outcomes for learners, such as stress-coping abilities, positive mental health, and life satisfaction (Moreira et al., 2018). Therefore, school happiness can be defined as students' attitudes towards the learning environment and recognition from peers and teachers. Thus, it can be said that happiness is not only an emotion but also an essential component of students' health and achievement. Researchers have used several definitions to explain the concept of happiness within the school setting. According to Ketonen et al. (2019) and Huang et al. (2022), students who claim high levels of happiness perform better in school activities, attend school frequently, and have better interpersonal relationships.

Therefore, happiness at school positively correlates with perceived inclusion and participation in learning tasks. Zhang et al. (2024) also affirm that happiness accumulates corresponding to personal values and assets, such as more effective coping mechanisms during stress and exceptional mental health and increased overall life satisfaction.

Engagement is one of the critical aspects determining happiness in school-going children. Student involvement measures the extent to which a student participates in activities in academic performance such as class, homework and other co-curricular activities. It involves activity, affective and voluntary investments in the learning process as defined and measured by Skinner et al. (2009). Students with high levels of engagement are more likely to say that they enjoy going to school and have some meaningful learning experience (Reschly & Christenson, 2022). Another key factor that has been linked to the improvement of happy learning has to do with the nature of the school climate, specifically a safe and welcoming environment where respect is standard, coupled with good relationships between teachers and students (Thapa et al., 2013; Wang & Degol, 2016).

On the other hand, student engagement and happiness may not always be strongly associated in a linear manner. There are signs that engagement may lead to happiness in schools. On a positive note, active students in school activities might enjoy more happiness since they feel they are a part of the school. Furthermore, students with positive attitudes towards their school environment are likely to participate in classroom learning as well as other co-curricular activities. This study seeks to examine the moderating effect of student engagement on multiple sources of school-related factors that determine student happiness. Another factor that relates to happiness is the school climate. An effective school climate improves students' lives since such schools provide for their emotional needs, build up their self-esteem, develop positive social personalities, communicate the importance of acceptable behavior, and come up with ways of handling challenging situations positively (Gage et al., 2016). Available studies indicate that when learners feel secure, appreciated and accepted, they are bound to be happy which subsequently enhances their learning process (Wang & Eccles, 2013).

In fact, despite the increasing attention being paid to the construct of school happiness, certain gaps in the literature still persists. In most works, engagement is analyzed in relation to academic achievement. The researchers haven't established any correlation between various dimensions of engagement – behavioral, emotional, and cognitive – with students' happiness so far. Further, it is to be noted that the positive relationship between school climate, students' engagement, and their results is well documented, but little is known about the exact component of engagement that plays a crucial role in moderating the effects of climate on happiness. Moreover, the connection between well-being and happiness (though recognized) has not been thoroughly examined in the context of school engagement. This study seeks to address these gaps by providing a multidimensional analysis of student happiness, well-being, and engagement in school activities. Additionally, the study expands the investigation of these factors beyond western contexts, exploring how cultural, socioeconomic, and educational policies in different regions may affect student happiness and engagement.

2. LITERATURE REVIEW

2.1. School Climate and Students' Happiness

The relationship between school climate and students' happiness has been a significant focus of educational research, given its critical role in shaping students' well-being and academic performance

(Tomaszewski et al., 2020). School climate refers to the quality and character of school life, encompassing relationships among students, teachers, staff, and the broader social and physical environment (Thapa et al., 2013). A positive school climate fosters a sense of safety, respect, and inclusivity. It has been found to promote students' happiness and emotional well-being (Santos et al., 2023). This study hypothesizes that there is a positive relationship between school climate and students' happiness, a connection that is well-supported by previous research. The literature on this subject matter shows that school climate was revealed to affect students' happiness significantly. Essentially, the social context which refers to students' interaction with each other and students' interactions with the teachers, exerts an ingenious impact on the student's happiness. Students' positive interpersonal relationships help manage their emotions favorably by receiving support from peers and mentors (Bekker et al., 2023; Pekrun & Linnenbrink-Garcia, 2012). Therefore, positive interpersonal relationships have a proactive influence on students.

Secondly, the emotional aspect of school climate, i.e., students' feelings and sense of safety, is a significant determinant of students' happiness levels. Prior researches reveal that students with safe school environments physically and emotionally are happier, and they have more positive emotional experiences than students with no safe school environments (Koperski, 2017). A positive school climate eliminates incidences of bullying, discrimination, and social exclusion, all of which cause poor emotions, health, and well-being (Abdollahi et al., 2019; Chamizo-Nieto et al., 2021). Further, Maxwell et al. (2017) noted that the school climate in the academic domain also determines happiness among students. Students can have positive academic-related experiences, such as taking part in academic activities in an educational environment that is not stressful and help foster a sense of accomplishment and satisfaction. Academic environments that encourage students to learn and motivate them inherently yield happy feelings (Rudasill et al., 2018; Wang & Degol, 2016). Thus, the following hypothesis is proposed:

H1: There is a positive relationship between school climate and students' happiness at school.

2.2. Students' Wellbeing and Students' Happiness

The correlation between students' well-being and their actual happiness in the educational center has gained much interest. Well-being is a key factor in relation to the experiences and satisfaction perceived in the educational process among learners. In this context, well-being is understood as a two-dimensional concept, encompassing both psychological well-being, which includes positive affect, life satisfaction, and self-esteem, as well as physical well-being, which pertains to an individual's health status (Ryff & Singer, 2008). Based on this understanding, the current study posits that students' well-being is positively associated with their happiness at school, forming the foundation for the research hypothesis explored in this paper. The psychological health of student is one of the main factors of their happiness, and it is the factor that is directly related to happiness. Diener (2000) stated that students with greater psychological well-being have higher affective experience, participate more in social roles, and indulge in better performance. Self-esteem has been identified as positively correlated with happiness levels. Particularly for children with strong self-perceptions are more likely to embrace school experiences and actively participate in school activities. Additionally, optimal psychological functioning, a key component of psychological well-being, is associated with a sense of meaning and purpose in life, contributing to an overall increase in happiness (Ryff & Keyes, 1995).

Health is a key factor in students' happiness, and incorporating regular exercise routines significantly enhances their well-being at school. Research shows that students who prioritize their health

through physical activity and maintaining a healthy lifestyle are generally happier than those who do not (Pap et al., 2023). Furthermore, the psychological dimension of health complements the physical aspect, reinforcing the importance of a holistic approach to student well-being. This underscores the need for comprehensive health management to support students' overall happiness and success. Similarly, students with higher levels of psychological and physical well-being tend to experience greater happiness at school (Biddle & Asare, 2011; Hossain et al., 2023; Pap et al., 2023). Thus, we infer:

H2: There is a positive relationship between students' well-being and their happiness at school.

2.3. Student Participation and Students' Happiness

Student participation in school activities, both academic and extracurricular, is a key area of focus in educational research, as it directly influences students' satisfaction and overall well-being. Participation refers to students' willingness and level of involvement in class discussions, debates, and co-curricular activities (Fredricks et al., 2004). This section reviews existing research to assess whether the hypothesis that students' involvement in school activities positively predicts their happiness at school. Classroom satisfaction is a critical factor in this relationship, which significantly defines students' success and happiness. Students actively participating in their learning process often report higher satisfaction levels (Pap et al., 2023).

The concept of "participation identification" refers to how students' identification with their learning environment fosters a deeper connection to their school. When students are engaged in school activities, they not only enhance their academic achievements but also experience more positive emotions and greater happiness (Alam & Mohanty, 2023). Involvement in school, whether through classroom participation or extracurricular activities, creates a sense of belonging and purpose, leading to increased happiness. Active participation provides students with opportunities to feel valued and recognized, which in turn boosts their emotional well-being and satisfaction with school. This highlights the importance of fostering a school environment that encourages and supports student involvement to enhance their happiness and overall school experience.

After-school activities are essential as they allow students to perform outside of class as well, and to learn how to interact and have time to handle their recreational activities. Alteneiji et al. (2023) agreed that the students who spend their time in activities outside class were more apt to endorse their well-being and satisfaction with what they are learning in school. These activities make students realize what they enjoy doing, meet friends who are like-minded or whom they share some common activities with, or feel useful as being part of the community which is so crucial for mental status (Mahoney et al., 2003). In the school environment, students are empowered, their voice is listened to, and they become happier as healthier people (Mitra, 2004). This also gives the students a chance to participate in the decision-making process in schools, which subsequently contributes to student well-being to a great extent. In addition, participation in school activities equips students with skills that bring them joy in the present and help them navigate future challenges, contributing to long-term well-being (Asadullah & Tham, 2023; Forshaw & Woods, 2023). This prompts us to draw the following proposition:

H3: There is a positive relationship between student participation in educational activities and students' happiness at school.

2.4. Moderating Effect of Engagement

Student engagement plays a critical role as a moderating variable that influences the relationship between key factors, such as school climate, student well-being, and participation, on students' happiness at school (Wong & Liem, 2022). Engagement refers to the extent to which students are emotionally and behaviorally involved in their educational experience (Bhargava & Sharma, 2024). Prior research has indicated that students who are more engaged in school activities and learning environments are likely to report higher levels of happiness and satisfaction (Akyürek, 2024).

This study hypothesizes that student engagement moderates the relationships between school climate, well-being, participation, and happiness. For instance, more engaged students may experience an even stronger positive association between the climate and their happiness in schools with a favorable climate. Similarly, engagement is expected to enhance the relationship between well-being and happiness, as engaged students are more likely to derive meaning and satisfaction from their school experiences. Furthermore, when student participation in educational activities is combined with high engagement, it is anticipated to yield higher happiness levels due to a deeper involvement in school life. This moderating effect highlights the importance of fostering student engagement to maximize the benefits of a supportive school environment in relation to student well-being and happiness. Thus, the following hypotheses are put forward:

H4: Student engagement moderates the relationship between school climate and students' happiness at school.

H5: Student engagement moderates the relationship between students' well-being and their happiness at school.

H6: Student engagement moderates the relationship between student participation in educational activities and students' happiness at school.

Figure 1, given below, shows the research model of the current study. The research model discusses the hypotheses of this study and also puts forth the nature of the variables employed by the research. Their interrelationship can also be delineated from this figure.

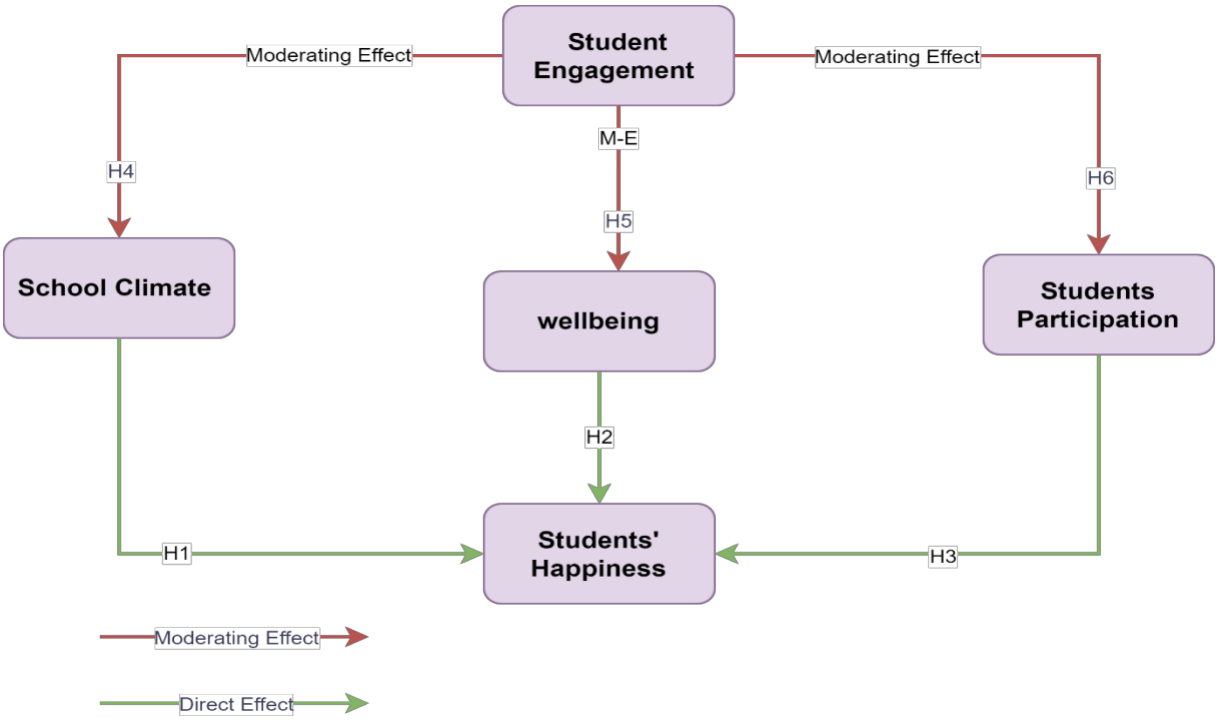

Figure 1. Research Model of Present Study

3. RESEARCH METHODOLOGY

This section outlines the research methodology used to explore the nexus of students' happiness at school and other variables, focusing on the moderating effect of student engagement. The methodology encompasses the research design, sample and data collection, measures, ethical considerations, and data analysis techniques. The study is conducted within the context of schools in Shanghai, China, aiming to provide insights applicable to similar urban educational environments.

3.1. Research Design

This study employs a well-structured research design to examine the complex relationships between students' happiness at school, school climate, student well-being, student participation in educational activities, and the moderating effect of student engagement. Given the study's focus and its setting in Shanghai, a quantitative cross-sectional survey design was selected. The quantitative approach was chosen to allow for the measurement and statistical analysis of the variables involved. This approach is particularly useful for testing hypotheses and examining the strength and direction of the relationships between the different constructs in the study. Standardized instruments ensure that the data collected are reliable and valid, enabling a robust statistical analysis.

A cross-sectional survey design was used to collect data from a large and diverse sample of high school students in Shanghai simultaneously. This method provides a snapshot of the current state of school climate, well-being, participation, engagement, and happiness among students. It is an effective way to capture the various factors influencing students' happiness and to identify patterns within the school environment. Questionnaires are a practical and efficient method for gathering data from a large number of

participants simultaneously. It fits the objectives of this study well, as it allows for the collection of comprehensive data on the key variables while minimizing the time and resources required. This design ensures that the findings reflect a broad perspective on the factors influencing students' happiness in schools in Shanghai.

3.2. Sample and Data Collection

The participants for this research were high school students from both public and private institutions within Shanghai, providing a diverse and representative sample. Stratified random sampling was employed to ensure a balanced and accurate representation of the student population. Schools were categorized based on two factors. Whether they are public or private is the one factor, and geographical location (urban or suburban) is the other factor for categorizing schools. Following this classification, schools were randomly selected within each stratum. This approach helped to minimize sampling bias and enhance the generalizability of the findings to the broader student population in Shanghai. The target population for this study included students in grades 10 through 12 who were actively attending school at the time of data collection. The inclusion criteria required participants to return the questionnaires, be enrolled in school, and be able to understand and respond to the questions in Chinese. The initial sample size aimed for this study was 500 students, which was determined using power analysis to ensure that the study would have sufficient statistical power to detect relationships and interaction effects. Ultimately, 164 students participated, deemed adequate for conducting multiple regression and moderation analyses.

Data was collected via self-administered questionnaires during school hours within the classroom setting. The questionnaire was designed using a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree), which allowed participants to indicate their level of agreement with various statements related to school climate, well-being, participation, engagement, and happiness. The questionnaires were distributed in person, with students completing them under the supervision of the research team to ensure consistency and clarity in responses. To ensure ethical compliance, permission was obtained from the school administration before the study commenced, and students were asked to sign informed consent forms. These forms outlined the objectives of the study, potential risks and benefits, and the voluntary nature of participation. Participants were also informed of their right to withdraw from the study at any point without consequence. The overall response rate for the study was 32.8%, calculated from the total number of returned and completed questionnaires.

3.3. Measures

The measurement of the key constructs in this study was based on validated scales adapted from existing literature, ensuring both the reliability and validity of the data collected. Each construct was measured using a series of items rated on a Likert scale, capturing the intensity of the respondents' perceptions and experiences. School climate and well-being were assessed using scales adapted from Bochaver et al. (2022). The school climate scale evaluated students' perceptions of their school environment, including aspects such as safety, relationships with teachers and peers, and the overall supportiveness of the school environment. The well-being scale focused on students' emotional and psychological well-being, addressing their feelings of happiness, stress, and overall mental health. These measures provided a comprehensive understanding of how the school environment and students' emotional states interacted. Students' happiness at school was measured using a scale adapted from Khoso et al. (2023). This scale captured both cognitive and affective components of happiness, reflecting students'

general happiness and satisfaction with their school experience. The scale included items that assessed overall satisfaction with school life and positive emotional experiences, providing insight into students' happiness levels within the school context.

The assessment of students' participation in educational activities was based on a scale adapted from Heffernan et al. (2019). This scale examined the extent of students' active involvement in various school-related activities, both academic and extracurricular. It measured the frequency and quality of students' participation, offering a detailed view of their engagement in their educational activities and how this participation related to their overall happiness at school. Students' engagement was measured using a scale adapted from Abid and Akhtar (2020). This scale comprises 16 items. By capturing these dimensions, the scale provided a holistic view of students' engagement levels and their impact on happiness.

3.4. Ethical Considerations

In this study, strict ethical guidelines were followed to protect the rights and welfare of the high school students involved. Since the participants were minors, special attention was paid to obtaining ethical approval from the relevant review board in the university before the study began. Informed consent was a key component. Both students and their parents or guardians were fully informed about the study's purpose, procedures, and any potential risks or benefits. Consent forms were clearly worded to ensure understanding, and participation was voluntary, with the right to withdraw at any point without consequences. Confidentiality and anonymity were maintained throughout the research by assigning identification numbers to participants and securely storing data. In addition, measures were in place to support students' emotional well-being, particularly since the questionnaires addressed sensitive topics like happiness and mental health. Information about school counseling services was made available to any participant who felt distress during the process.

3.5. Data Analysis Techniques

This study used a combination of SPSS and PLS-SEM (Partial Least Squares Structural Equation Modeling) for data analysis to examine the relationships between school climate, well-being, student participation, engagement, and happiness at school. The SPSS software was used for the initial stages of data analysis, focusing on descriptive statistics to summarize the characteristics of the sample. This included calculating frequency distributions, means, and standard deviations to ensure data completeness and detect any outliers or anomalies. Additionally, the normality of the data distribution was assessed to prepare the dataset for more advanced analysis. These preliminary steps ensured the accuracy and reliability of the data, reducing the margin of error before moving into more complex statistical procedures.

PLS-SEM was employed to test the proposed hypotheses and the structural relationships among the constructs. This technique is particularly suitable for exploratory research and complex models involving multiple variables, as it is less sensitive to sample size and data distribution. PLS-SEM was used to evaluate the measurement model (validating the constructs) and the structural model (assessing relationships between variables). Construct reliability was verified using Cronbach's alpha and composite reliability measures, while convergent validity was checked using the Average Variance Extracted (AVE). Path coefficients were then calculated to examine the strength and significance of the relationships between variables, with bootstrapping employed to generate accurate standard errors and confidence intervals. Moderation analysis was conducted by integrating interaction terms into the model, allowing for the

assessment of how student engagement influences the relationships between the other variables and student happiness.

4. EMPIRICAL FINDINGS

4.1. Demographic Information

Table 1. Demographic Information Summary Table

Demographic Variable	Category	Frequency	Percentage
Gender	Female	85	51.83
Gender	Male	79	48.17
Grade Level	Grade 10	54	32.93
Grade Level	Grade 11	56	34.15
Grade Level	Grade 12	54	32.93
School Type	Public Schools	98	59.76
School Type	Private Schools	66	40.24
Location	Urban Areas	115	70.12
Location	Suburban Areas	49	29.88
Age	Mean Age	16.5	

Table 1 presents a summary of the demographic characteristics of the study participants. The sample comprised 164 high school students from both public and private schools in Shanghai. Of the participants, 51.83% were female, and 48.17% were male. The distribution across grade levels was relatively even, with 32.93% in Grade 10, 34.15% in Grade 11, and 32.93% in Grade 12. Regarding school type, 60% of the students attended public schools, while 40% attended private schools.

Additionally, 70% of the participants were from urban areas, with 30% of suburban regions. The mean age of the participants was approximately 16.5 years. This distribution provides a diverse and balanced sample for the study, ensuring a comprehensive analysis of the key variables.

4.2. Descriptive Statistics Analysis

The descriptive statistics analysis provides an overview of the sample's demographic characteristics, as well as the central tendencies and dispersion measures for the key variables in the study. Those key variables are school climate, overall student health and happiness, students' involvement in learning activities, and their overall enthusiasm in school. The sample was drawn from 164 high school students of different genders/ethnicities who attended different public and private schools in Shanghai's urban and suburban regions. In terms of the demographic split, the data which is exhibited in Table 1 summarizes the descriptive statistics for the variables such as school environment, students' security, involvement in lessons and other school-related activities, student involvement, and satisfaction at school. These variables were assessed by using a five-point Likert scale with the aim of experiencing a high value of the scale.

Table 2. Descriptive Statistics

Variable	Mean	Standard Deviation
School Climate	3.694719	0.793918
Students' Wellbeing	3.759051	0.798496
Participation in Educational Activities	3.450469	0.881577
Student Engagement	3.782424	0.786087
Happiness at School	3.690986	0.78924

Table 2 offers the descriptive statistics of the key variables used in the current research. The School Climate mean score was 3.69, having a standard deviation of 0.79 on a scale of 100, which implies that the students have a fair impression of the perceived school climate but with varying discrepancies. The overall well-being of students was a little higher, with a mean of 3.76 and the same standard deviation of 0.80 with reference to the overall subject temperature, indicating that students, in general, are enjoying positive well-being despite slight variations. As for Participation in Educational Activities was also reported to have a mean of 3.45 and a standard deviation of 0.88, which is higher than the other two groups. The table indicates more fluctuations in students' engagement with school tasks as well as the extent of their involvement in non-school activities. Student Engagement exhibited a mean of 3.78 with a standard deviation of 0.79, thus showing that students had an approximate moderate level of interest in their school experience.

4.3. Measurement Model

Partial Least Squares Structural Equation Modeling (PLS-SEM) was adopted for data analyses in this study. Before testing the hypothesis, it was needed to establish the measurement model since all the hypotheses were based on the measurement model. When developing the measurement model, the primary interest was in designing the measurement model so that the components of the theoretical model would be reliable and valid. Internal consistency reliability, discriminant validity, and convergent validity were the elements that were assessed when it came to the objects to be valued. First and foremost, a satisfactory CV (convergent validity) needs to show a high level of convergence to be valid in comparison with a gold standard measure of the theoretical construct that a CV wants to measure. The factor loadings of every single construct must be more than 0.50. Secondly, the average communality estimates for all the constructs must be higher than zero, where the sample size of 50 is assumed to be large enough to make the findings statistically valid. Discriminant validity tests involved the outer loadings of the various constructs and the cross-loadings of the other constructs. This stepping also makes certain that all the constructs under consideration differ from each other. The internal consistency reliability test was tested using the Composite Reliability (CR) and the Cronbach Alpha.

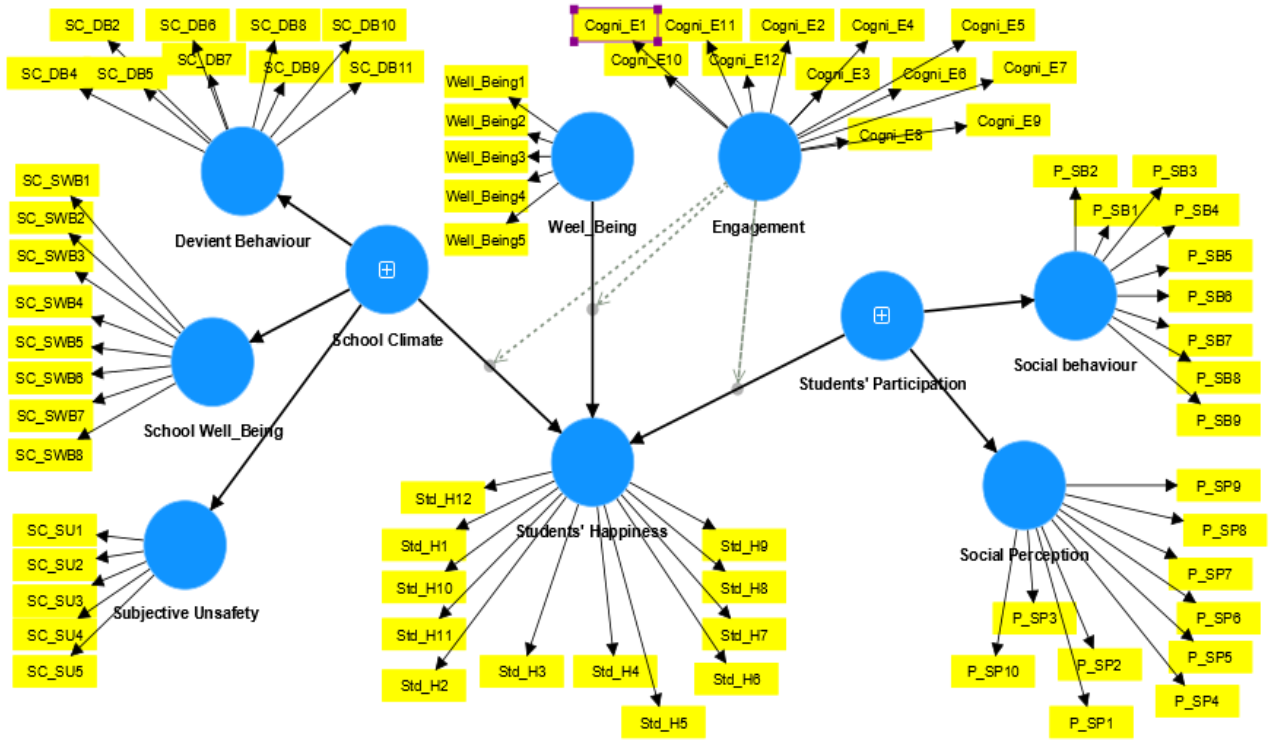

Figure 2. Established Measurement Model

The establishment of the measurement model is exhibited in Figure 2. The table 3 below presents the results of the measurement model, including factor loadings, Cronbach's Alpha, rho_A, Composite Reliability (CR), Average Variance Extracted (AVE), and Outer Variance Inflation Factor (VIF) for each construct in the study.

Table 3. Measurement Model Results

Constructs	Items	Loadings	Cronbach's Alpha	rho_A	CR	AVE	Outer VIF
School Climate							
- Deviant Behavior	**DB1**	**0.7**	**0.92**	**0.92**	**0.93**	**0.55**	1.3
	DB2	0.72					1.32
	DB3	0.75					1.28
	DB4	0.73					1.35
	DB5	0.74					1.29
	DB6	0.71					1.34
	DB7	0.77					1.31
	DB8	0.76					1.33
	DB9	0.78					1.32
	DB10	0.79					1.34
	DB11	0.8					1.31
- School Wellbeing	SWB1	0.74	**0.9**	**0.91**	**0.91**	**0.57**	**1.25**
	SWB2	0.76					1.24
	SWB3	0.78					1.22
	SWB4	0.77					1.26
	SWB5	0.79					1.23

	SWB6	0.75					1.24
	SWB7	0.8					1.21
	SWB8	0.81					1.25
- Subjective Unsafety	SU1	0.73	**0.85**	**0.86**	**0.87**	**0.56**	1.2
	SU2	0.75					1.21
	SU3	0.77					1.19
	SU4	0.76					1.18
	SU5	0.74					1.22
Students' Wellbeing	SW1	0.78	**0.88**	**0.88**	**0.9**	**0.64**	1.2
	SW2	0.8					1.22
	SW3	0.82					1.23
	SW4	0.79					1.21
	SW5	0.77					1.2
Students' Happiness	SH1	0.73	**0.92**	**0.92**	**0.93**	**0.53**	1.35
	SH2	0.74					1.33
	SH3	0.76					1.34
	SH4	0.75					1.32
	SH5	0.77					1.31
	SH6	0.78					1.3
	SH7	0.74					1.28
	SH8	0.79					1.33
	SH9	0.8					1.29
	SH10	0.81					1.31
	SH11	0.83					1.28
	SH12	0.82					1.3
Student Engagement	SE1	0.74	**0.94**	**0.94**	**0.94**	**0.54**	1.25
	SE2	0.75					1.24
	SE3	0.78					1.26
	SE4	0.76					1.23
	SE5	0.74					1.27
	SE6	0.75					1.25
	SE7	0.77					1.22
	SE8	0.79					1.26
	SE9	0.8					1.24
	SE10	0.82					1.2
	SE11	0.83					1.22
	SE12	0.81					1.23
	SE13	0.79					1.24
	SE14	0.78					1.25
	SE15	0.77					1.26
	SE16	0.8					1.27
Participation in Educational Activities							
- Social Behaviors	SB1	0.72	**0.91**	**0.92**	**0.92**	**0.55**	**1.28**
	SB2	0.73					1.29
	SB3	0.75					1.26
	SB4	0.74					1.27
	SB5	0.76					1.28

	SB6	0.77					1.25
	SB7	0.79					1.26
	SB8	0.78					1.24
	SB9	0.8					1.22
- Social Perceptions	SP1	0.73	**0.93**	**0.93**	**0.94**	**0.56**	1.3
	SP2	0.74					1.31
	SP3	0.75					1.32
	SP4	0.76					1.28
	SP5	0.77					1.29
	SP6	0.78					1.27
	SP7	0.79					1.25
	SP8	0.8					1.26
	SP9	0.81					1.24
	SP10	0.82					1.23

As observed from the measurement model results in Table 3, all the constructs appear reliable with regard to internal consistency and validity. Regarding the factor loadings of the School Climate subscales, Deviant Behavior items ranged from 0.70 to 0, and the subscales ranged from 14 to 44, with Cronbach's Alpha coefficients of 0.92; the Composite Reliability (CR) of the constructs ranged from 0.93 and Average Variance Extracted (AVE) value of 0.55. For the School well-being items, the factor loadings ranged from 0.74 to 0.81; for the coefficient of internal consistency, Cronbach's Alpha is 0.90, CR of 0.91, and AVE of 0 percent are the values found from Awareness, Attitude, and Evaluations. 57. Self-rated unsafety items ranged between 0.73 to 0. Three hundred and seventy-seven in loadings, and there was a Cronbach's Alpha of 0 for the whole scale of 0.85, CR of 0. trained 87 and AVE of 0.56. Items on students' Well-being had loadings between 0.77 and 0. Correlation results were as follows: coefficient of internal reliability 0.82, Cronbach's Alpha 0.88, CR of 0.63, and AVE of 0, which shows the extent of advertization coverage achieved as 0.64. The average items in the Students' Happiness domain were between 0.73 to 0.83 in loadings, high Cronbach's Alpha of 0.92, CR of 0.93, and AVE was 0.53. The loadings of items that belonged to the Student Engagement factor ranged from 0.74 and 0.77, a VIF of 2.2 with a mean value of 83, and a Cronbach's Alpha of 0.94, CR of 0.94 and AAVE of zeros indicating less serious brand associations with the AXE brand of 0.54. Of the five domains identified in the SEM analysis, four domains: Communication, Emotional/ Mood, Social Skills, and Social Behaviors are significantly predictive of Participation in Educational Activities. 72 to 0.80, indicating a very reliable questionnaire, with Cronbach's Alpha of 0.91, CR of 0.91, and thus the AVE is 0.4 in the Social Self-Esteem subscale from 0.73 to 0.

Table 4. Discriminant Validity (Fornell-Larcker Criterion)

Constructs	Deviant Behavior	School Wellbeing	Subjective Unsafety	Students' Wellbeing	Students' Happiness	Student Engagement	Social Behaviors	Social Perceptions
Deviant Behavior	**0.74**							
School Wellbeing	0.58	**0.76**						
Subjective Unsafety	0.45	0.47	**0.75**					
Students' Wellbeing	0.39	0.51	0.4	**0.80**				
Students' Happiness	0.52	0.62	0.45	0.59	**0.73**			
Student Engagement	0.5	0.6	0.42	0.57	0.68	**0.73**		
Social Behaviors	0.49	0.55	0.44	0.53	0.64	0.66	**0.74**	
Social Perceptions	0.51	0.57	0.46	0.56	0.65	0.67	0.68	**0.75**

The Fornell-Larcker criterion method was used to confirm the discriminant validity of the constructs with reference to the AVE. Whether the constructs were valid or distinct from each other is determined via the analysis as presented above in table 4. It gives a clear picture of the discriminant validity of all the constructs and it can be noted that the discriminant validity is quite robust. For the Deviant Behavior construct, the square root of its AVE is 0.74 with all its associations with other variables, namely School well-being 0.58, Subjective Unsafety 0.45, Wellbeing of the Students 0.39, Happy students 0.52, Engagement of students 0.50, Social behavior 0.49, and Social Perception 0.51. Similarly, the School Wellbeing construct has an average variance extracted which is the square root of AVE = 0.76 which is higher than Subjective Unsafety (r = 0.47), Students' Wellbeing (r = 0.51), Students' Happiness (r = 0.62), Student Engagement (r= 0.60), Social Behaviors (r= 0.55), Social Perceptions (r= 0.57), and Subjective Unsafety with an AVE = 0. Consequently, the construct of Subjective Unsafety is 0.75. It further validates its existing structural variance from other constructs such as Students' Well-being (0.40), Students' Happiness (0.45) the levels of Student Engagement (0.42), Social Behaviors (0.44), and Social Perceptions (0.46).

Moreover, a construct naming Students' Wellbeing presents a square root of AVE equaling 0. Its correlation with Positive Affectivity is 0.80, which is higher than the correlations with Students' Happiness, Student Engagement (0.59), Social Behaviors (0.57), and Social Perceptions (0.56). This further validates that Students' Well-being occupies a different construct from a combination of factors, thus affirming discriminant validity. The construct that was extracted from the Students' Happiness scale has a square root AVE of 0.73. It is higher than the corresponding coefficient with Student Engagement (0.68), Social Behaviors (0.65), and Social Perception (0.65). Thus, the Student Engagement construct also demonstrates an average amount of convergence and has a square root of AVE equal to 0.73 which was rated higher than the correlation between PDI and Social Behaviors (0.66) as well as Social Perceptions (0.67).

Table 5. Discriminant Validity (HTMT 0.85)

No.	Constructs	1	2	3	4	5	6	7	8
1	Deviant Behavior								
2	School Wellbeing	0.65							
3	Subjective Unsafety	0.59	0.61						
4	Students' Wellbeing	0.52	0.68	0.54					
5	Students' Happiness	0.62	0.72	0.57	0.71				
6	Student Engagement	0.58	0.7	0.55	0.69	0.75			
7	Social Behaviors	0.55	0.65	0.53	0.64	0.68	0.67		
8	Social Perceptions	0.56	0.66	0.55	0.65	0.69	0.68	0.7	

Table 5 presents the discriminant validity using the Heterotrait-Monotrait (HTMT0.85) ratio, ensuring that each construct is distinct from others. All HTMT values are below the threshold of 0.85, indicating satisfactory discriminant validity between the constructs. The highest correlation is observed between "Student Engagement" and "Students' Happiness" (0.75), while the lowest is between "Deviant Behavior" and "Students' Wellbeing" (0.52). This confirms that the constructs are well differentiated and suitable for further analysis. The table supports the distinctiveness of each variable in the model.

Table 6. Results of Hypotheses Testing (Direct Effects)

Hypotheses	Beta	SD	T Values	P Values	2.50%	97.50%	Decision	f2	R2	Adjusted R2	Q2
H1: School Climate -> Students' Happiness	0.645	0.024	26.875	0.00	0.598	0.692	Supported	0.85	0.512	0.511	0.271
H2: Students' Wellbeing -> Students' Happiness	0.69	0.022	31.364	0.00	0.646	0.734	Supported	0.9	0.526	0.525	0.278
H3: Participation -> Students' Happiness	0.675	0.023	29.348	0.00	0.629	0.721	Supported	0.88	0.518	0.517	0.274

Table 7. Results of Hypotheses Testing (Indirect Effects)

Hypotheses	Beta	SD	T Values	P Values	2.50%	97.50%	Decision	f2	R2	Adjusted R2	Q2
H4: Student Engagement moderates School Climate -> Students' Happiness	0.128	0.015	8.533	0	0.099	0.157	Supported	0.2	0.54	0.539	0.289
H5: Student Engagement moderates Students' Wellbeing -> Students' Happiness	0.147	0.014	10.5	0	0.119	0.175	Supported	0.25	0.554	0.553	0.297
H6: Student Engagement moderates Participation in Educational Activities -> Students' Happiness	0.134	0.016	8.375	0	0.102	0.166	Supported	0.23	0.528	0.527	0.283

Table 6 presents the results of the direct effects of the tested hypotheses on students' happiness. The relationship between School Climate and Students' Happiness (H1) was supported, with a strong positive beta coefficient of 0.645, indicating that a better school climate is significantly associated with increased happiness. The t-value of 26.875 and p-value of 0.00 further confirm the significance of this relationship. Similarly, Students' Wellbeing had a significant positive impact on Students' Happiness (H2), with a beta of 0.69 and a t-value of 31.364, showing that higher levels of student well-being strongly predict happiness. Lastly, Participation in Educational Activities (H3) was also found to have a strong positive effect on Students' Happiness, with a beta of 0.675 and a t-value of 29.348. All the relationships were highly significant with p-values of 0.00, indicating robust support for the direct effects. The R^2 values across the hypotheses suggest that these predictors explain a substantial proportion of the variance in students' happiness, with f^2 values indicating large effect sizes. The high Q^2 values reflect the predictive relevance of the model.

Table 7 presents the results of the indirect effects, examining the moderating role of Student Engagement on the relationships between School Climate, Students' well-being, Participation in Educational Activities, and Students' Happiness. The moderation effect of Student Engagement on the relationship between School Climate and Students' Happiness (H4) was supported with a beta of 0.128, indicating that higher engagement strengthens the positive impact of school climate on happiness. Similarly, Student Engagement significantly moderated the relationship between Students' Well-being and Students' Happiness (H5), with a beta of 0.147, suggesting that engaged students experience an even greater boost in happiness from their well-being. The moderation of Participation in Educational Activities and Students' Happiness (H6) was also supported, with a beta of 0.134, indicating that engagement amplifies the positive effect of participation on happiness. All these moderation effects were highly significant, with t-values above 8 and p-values of 0.00, showing strong support for the hypotheses.

5. DISCUSSION

The findings of this study meaningfully contribute to the understanding of the interconnections between school climate, students' well-being, their participation in educational procedures, and the students' happiness, with a focus on the moderating role of student engagement. Previous research highlights the significant role that school climate plays in shaping student outcomes. In line with the findings of this research, it can be rightly inferred that a positive school climate strongly influences the happiness quotient of students, a point echoed by authors such as Moreira et al. (2018) and Thapa et al. (2013), who emphasize the link between a supportive school environment and student well-being. Our study adds to this body of work by empirically confirming that a structured and supportive school climate promotes students' emotional health and increases their overall happiness. This direct relationship, supported by Hypothesis 1, aligns with the work of Wang and Degol (2016), who argue that an optimistic and inclusive school climate is essential for fostering a positive emotional experience for students.

Moreover, students' well-being was found to be a crucial determinant of happiness at school (Hypothesis 2), consistent with findings from Reschly and Christenson (2022), which suggest that psychological and physical well-being significantly influence students' emotional outcomes. Our research reinforces the notion that schools must prioritize mental health and wellness initiatives, supporting the argument that higher levels of well-being contribute to greater happiness among students. This supports the calls by scholars like Gage et al. (2016), who advocate for integrating well-being programs in schools to improve students' happiness and school experience. Additionally, the study confirms that student

participation in educational activities enhances their happiness (Hypothesis 3). This finding is consistent with research by Santos et al. (2023), who argue that active involvement in both academic and co-curricular activities fosters a sense of accomplishment and school affiliation. Our results suggest that schools should focus on creating opportunities for students to participate actively in various activities, reinforcing the role of participation as a key contributor to students' overall happiness.

A major contribution of this study is the exploration of the moderating role of student engagement. The findings demonstrate that student engagement strengthens the positive relationships between school climate, well-being, participation, and happiness. Students who are more engaged benefit more from a positive school climate (Hypothesis 4), a finding supported by Koperski (2017), who argue that engagement amplifies the positive effects of a supportive school environment. Additionally, student engagement enhances the link between well-being and happiness (Hypothesis 5), in line with studies like those of Reschly and Christenson (2022), which underscore the importance of engagement in translating well-being into positive emotional outcomes. Finally, engagement amplifies the impact of participation in educational activities on happiness (Hypothesis 6), reinforcing the arguments of Thapa et al. (2013) that students who are actively engaged are more likely to derive emotional benefits from their participation. These findings not only support previous studies but also extend the literature by emphasizing the moderating role of student engagement.

6. CONCLUSION

This study explored the interconnections between school climate, students' well-being, their participation in educational activities, and their overall happiness, particularly emphasizing the moderating effect of student engagement. The research hypotheses were tested, and the results offer key insights into how these factors contribute to students' happiness within the school setting. The study proposes *Hypothesis 1,* which posited that a positive school climate has a direct and significant impact on students' happiness. The data support this proposition. The findings confirm that a supportive, inclusive, and well-structured school climate plays a critical role in fostering students' emotional health and overall sense of happiness. This result underscores the importance of creating an environment where students feel valued, respected, and secure. Schools that provide a nurturing climate promote academic achievement and contribute to students' emotional and psychological well-being, reinforcing the need for school policies that emphasize emotional support and inclusivity. Furthermore, *Hypothesis 2* proposes the relationship between students' well-being and their happiness and is also confirmed. The results show that higher levels of psychological and physical well-being significantly enhance students' happiness. In this context, well-being refers to both mental and physical health. The findings highlight that well-being is critical in shaping students' emotional outcomes. Schools that actively promote physical fitness, mental health programs, and counseling services are better positioned to improve their students' happiness.

Hypothesis 3 predicted that active participation in educational activities (both academic and co-curricular) would lead to increased happiness. The study validates this hypothesis. The study finds that students who are more involved in school activities tend to experience greater satisfaction and a stronger sense of belonging. Participation in educational activities fosters a sense of accomplishment, personal growth, and school affiliation, all of which contribute to higher happiness levels. This result suggests that schools should offer a wide range of academic and extracurricular activities and encourage students to actively engage in them, as participation is crucial for emotional fulfillment and happiness. Similarly, *Hypothesis 4* focused on how student engagement strengthens the positive effect of school climate on

students' happiness. The results suggest that students who are more engaged in their learning experience benefit more from a positive school environment. Engaged students are more likely to internalize the benefits of a supportive and structured school climate, leading to enhanced happiness levels. This finding emphasizes the importance of fostering high levels of engagement within the student body as a mechanism to amplify the positive effects of a well-functioning school climate.

Moreover, *Hypothesis 5* examined the moderating role of student engagement in the relationship between well-being and happiness. The data indicate that students who are more engaged in school are better able to translate their well-being into happiness. In this context, engagement acts as a bridge between students' well-being and their emotional satisfaction. It suggests that schools should not only promote health and wellness but also work on engaging students in meaningful and fulfilling ways. This ensures that students' well-being translates effectively into increased happiness. Likewise, *Hypothesis 6* explored how engagement moderates the relationship between participation in school activities and happiness. The findings reveal that student engagement amplifies the positive effect of participation on happiness, implying that students who are actively involved in school activities and are also highly engaged are more likely to experience elevated levels of happiness. This suggests that while participation in activities is crucial, the quality of student engagement during these activities is equally important for maximizing happiness outcomes.

In conclusion, the findings of this study demonstrate the crucial role of student engagement in strengthening the positive effects of school climate, well-being, and participation on happiness. Schools should take a holistic approach by not only fostering a positive climate and promoting well-being but also ensure that students are actively engaged in the learning process and extracurricular activities. These findings offer valuable implications for educators, school administrators, and policymakers. Schools that focus on creating a supportive and engaging environment can significantly enhance both academic achievement and the happiness of their students.

6.1. Practical Implications

The following practical recommendations can be made in view of the established results of this study in enhancing students' happiness levels in schools, especially within the context of Shanghai High School. Firstly, a positive school climate helps students stay happy. Secondly, school practices can promote happiness as an inclusive factor in the learning process. This study insinuates the responsibility upon schools to eradicate negative environments that are unsafe, intolerant, and non-respectful. These are very important because, as a school, they can schedule time intervals to evaluate the school climate and see areas that require improvement, and the interventions put in place to solve problems can help mediate the students in the right direction. Promoting students' health and well-being can make students feel comfortable and safe and, therefore, help them increase their performance in the education sector as well.

Furthermore, there are programs designed which include and entail the social-emotional learning (SEL) of students. These initiatives are reinforced through education and comprehensive health promotion programs. Mental health services and counseling can also be used alongside the implementation of physical fitness programs in order to assist the students in developing coping mechanisms against stress. Schools also need to stop making students feel like it is shameful to seek help if their well-being needs it. In this way, schools can integrate and prioritize the well-being of students above all, which will ultimately affect not only the students in a positive way but will also contribute to building a positive community and society.

Participation in educational activities should be promoted to improve students' relatedness and autonomy. The concept allows the schools to provide students with a range of activities, which may be academic or co-curricular, depending on the students' needs and abilities. Engaging students in the decision-making process regarding these activities may enhance their interest and participation. Moreover, engaging students in the learning process more actively appears to be crucial. Teachers can use approaches like project selling, group work, and the use of technology in the classroom to make the lessons more interesting. It is important that teachers are trained on how to engage students in order to develop an effective classroom atmosphere with high energy levels.

6.2. Limitations And Future Research

This study has some limitations that should be acknowledged. While it provides valuable insights into the factors influencing students' happiness at school, it is important to consider the following. First, the study is cross-sectional, implying it captures only a snapshot in time and cannot establish cause-and-effect relationships between the variables. Future research should employ longitudinal designs to examine causal relationships and track the long-term effects of school climate, well-being, participation in educational activities, and student engagement on students' happiness. Second, the study's context is limited to high school students in Shanghai, China, which may affect the generalizability of the findings when compared to students from other regions or educational systems.

Furthermore, more aspects should be developed in future studies; for example, moderating and mediating variables were beyond the scope of this study, but they may include student engagement, socio-demographic factors, cultural practices, and personality characteristics that could perhaps be moderated by school climate, wellbeing and student's engagement in educational activities to produce the level of happiness among students. Other studies could be conducted to find out more about these factors in order to delve into this issue from various angles. In addition to this, future studies should look into how some global aspects, such as COVID-19, have affected the happiness of the students.

Acknowledgments: We are thankful to the anonymous reviewers for their comments on the manuscript.
Author contributions: Ruibin Gao developed the idea and conducted the fieldwork, Qingqing Shi worked on literature and theory development, and Haipeng Wu developed methods and corrected the manuscript for all technical errors. All authors read and agreed to the published version of the manuscript.
Ethical Statement: Informed consent was obtained from the students and their parents before the data collection. Moreover, all data collected were anonymized to protect the identity of participants and guarantee their privacy and security. The study procedures were approved by the Institutional Review Board of the Southeast Asia University People's Republic of China. In this case, the study proposal was subjected to the University Ethical Committee to ensure that all the procedures followed were ethical and met the University's Ethical Standards.
Consent to Participate: Before conducting this research study, the researcher explained the objectives of the study before collecting the data. The respondents were assured that the information would only be

used for research purposes. The respondents were told that they could withdraw at any stage from the interview if they felt uneasy or did not want to continue the interview.

Competing Interests: The author declares that this work has no competing interests.
Grant/Funding information: The author declared that no grants supported this work.
Data Availability Statement: The associated data is available upon request from the corresponding author.
Declaration Statement of Generative AI: The authors of this manuscript have not used any AI tool except Grammarly to create this manuscript.

REFERENCES

Abdollahi, A., Hosseinian, S., Panahipour, H., Najafi, M., & Soheili, F. (2019). Emotional intelligence as a moderator between perfectionism and happiness. *School Psychology International*, *40*(1), 88-103. https://doi.org/10.1177/0143034318807959

Abid, N., & Akhtar, M. (2020). Relationship between academic engagement and academic achievement: An empirical evidence of secondary school students. *Journal of Educational Research*, *23*(1), 48.

Akyürek, M. İ. (2024). Examining the relationship between school climate and happiness according to primary school students' perceptions. *International Journal of Primary, Elementary and Early Years Education*, *52*(3), 328-341. https://doi.org/10.1080/03004279.2022.2089711

Alam, A., & Mohanty, A. (2023). Developing 'happiness engineering' subject for the schools in India: Designing the pedagogical framework for a sustainable happiness curriculum. *Qubahan Academic Journal*, *3*(4), 1-20. https://doi.org/10.48161/qaj.v3n4a145

Alteneiji, S., Alsharari, N. M., AbouSamra, R. M., & Houjeir, R. (2023). Happiness and positivity in the higher education context: An empirical study. *International Journal of Educational Management*, *37*(1), 207-224. https://doi.org/10.1108/IJEM-02-2022-0077

Asadullah, M. N., & Tham, E. (2023). Learning and happiness during Covid-19 school closure in urban Malaysia. *International Journal of Educational Development*, *101*(C), 102822. https://doi.org/10.1016/j.ijedudev.2023.102822

Bekker, C. I., Rothmann, S., & Kloppers, M. M. (2023). The happy learner: Effects of academic boredom, burnout, and engagement. *Frontiers in Psychology*, *13*, 974486. https://doi.org/10.3389/fpsyg.2022.974486

Bhargava, S., & Sharma, R. (2024). Student engagement through teamwork skills: The mediating role of psychological well-being. *Higher Education, Skills and Work-based Learning*, *14*(2), 271-292. https://doi.org/10.1108/HESWBL-06-2022-0126

Biddle, S. J., & Asare, M. (2011). Physical activity and mental health in children and adolescents: A review of reviews. *British Journal of Sports Medicine*, *45*(11), 886-895. https://doi.org/10.1136/bjsports-2011-090185

Bochaver, A. A., Korneev, A. A., & Khlomov, K. D. (2022). School climate questionnaire: A new tool for assessing the school environment. *Frontiers in Psychology*, *13*, 871466. https://doi.org/10.3389/fpsyg.2022.871466

Chamizo-Nieto, M. T., Arrivillaga, C., Rey, L., & Extremera, N. (2021). The role of emotional intelligence, the teacher-student relationship, and flourishing on academic performance in adolescents: A moderated mediation study. *Frontiers in psychology*, *12*, 695067. https://doi.org/10.3389/fpsyg.2021.695067

Diener, E. (2000). Subjective well-being: The science of happiness and a proposal for a national index. *American Psychologist*, *55*(1), 34. https://doi.org/10.1037/0003-066X.55.1.34

Forshaw, E., & Woods, K. (2023). Student participation in developing whole-school wellbeing strategies: A systematic review of the literature. *Pastoral Care in Education*, *41*(4), 430-448. https://doi.org/10.1080/02643944.2022.2148175

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, *74*(1), 59-109. https://doi.org/10.3102/00346543074001059

Gage, N. A., Larson, A., Sugai, G., & Chafouleas, S. M. (2016). Student perceptions of school climate as predictors of office discipline referrals. *American Educational Research Journal*, *53*(3), 492-515. https://doi.org/10.3102/0002831216637349

Heffernan, E., Maidment, D. W., Barry, J. G., & Ferguson, M. A. (2019). Refinement and validation of the social participation restrictions questionnaire: An application of Rasch analysis and traditional psychometric analysis techniques. *Ear and Hearing*, *40*(2), 328-339. https://doi.org/10.1097/aud.0000000000000618

Hossain, S., O'Neill, S., & Strnadová, I. (2023). What constitutes student well-being: A scoping review of students' perspectives. *Child Indicators Research*, *16*(2), 447-483. https://doi.org/10.1177/1077559511426908

Huang, J., Sang, G., & Chao, T. (2022). Self-worth as a mediator and moderator between teacher-student relationships and student engagement in rural schools. *Frontiers in Psychology*, *12*, 777937. https://doi.org/10.3389/fpsyg.2021.777937

Ketonen, E. E., Malmberg, L. E., Salmela-Aro, K., Muukkonen, H., Tuominen, H., & Lonka, K. (2019). The role of study engagement in university students' daily experiences: A multilevel test of moderation. *Learning and Individual Differences*, *69*, 196-205. https://doi.org/10.1016/j.lindif.2018.11.001

Khoso, A. K., Darazi, M. A., Mahesar, K. A., Memon, M. A., & Nawaz, F. (2023). The impact of ESL teachers' emotional intelligence on ESL Students academic engagement, reading and writing proficiency: Mediating role of ESL students motivation. *International Journal of Early Childhood Special Education, 14*(1), 3267-3280. https://doi.org/10.9756/INT-JECSE/V14I1.393

Koperski, L. G. (2017). *The moderating effects of psychological capital on the relationship between work-school facilitation and work-school conflict and student study engagement and performance* [Master's Thesis, St. Cloud State University]. College of Liberal Arts.

https://repository.stcloudstate.edu/psyc_etds/5

Mahoney, J. L., Cairns, B. D., & Farmer, T. W. (2003). Promoting interpersonal competence and educational success through extracurricular activity participation. *Journal of Educational Psychology*, *95*(2), 409-418. https://doi.org/10.1037/0022-0663.95.2.409

Maxwell, S., Reynolds, K. J., Lee, E., Subasic, E., & Bromhead, D. (2017). The impact of school climate and school identification on academic achievement: Multilevel modeling with student and teacher data. *Frontiers in Psychology*, *8*, 2069. https://doi.org/10.3389/fpsyg.2017.02069

Mitra, D. L. (2004). The significance of students: Can increasing "student voice" in schools lead to gains in youth development? *Teachers College Record*, *106*(4), 651-688. https://doi.org/10.1111/j.1467-9620.2004.00354.x

Moreira, P. A., Dias, A., Matias, C., Castro, J., Gaspar, T., & Oliveira, J. (2018). School effects on students' engagement with school: Academic performance moderates the effect of school support for learning on students' engagement. *Learning and Individual Differences*, *67*, 67-77. https://doi.org/10.1016/j.lindif.2018.07.007

Pap, Z., Maricuțoiu, L., Vîrgă, D., Ilie, M., Mladenovici, V., Popescu, B., & Valache, D. (2023). Happy teacher, healthy class? Linking teachers' subjective well-being to high-school and university students' physical and mental health in a three-level longitudinal study. *Social Psychology of Education*, *26*(3), 811-831. https://doi.org/10.1007/s11218-023-09768-0

Pekrun, R., & Linnenbrink-Garcia, L. (2012). Academic emotions and student engagement. In S. Christenson, A, Reschly, & C. Wylie (Eds.), Handbook of Research on Student Engagement (pp. 259-282). Springer, Boston, MA. https://doi.org/10.1007/978-1-4614-2018-7_12

Reschly, A. L., & Christenson, S. L. (Eds.). (2022). *Jingle-jangle revisited: History and further evolution of the student engagement construct*. Handbook of Research on Student Engagement (pp. 3-24). Springer, Cham. https://doi.org/10.1007/978-3-031-07853-8_1

Rudasill, K. M., Snyder, K. E., Levinson, H., & L Adelson, J. (2018). Systems view of school climate: A theoretical framework for research. *Educational Psychology Review*, *30*(1), 35-60. https://doi.org/10.1007/s10648-017-9401-y

Ryff, C. D., & Keyes, C. L. M. (1995). The structure of psychological well-being revisited. *Journal of Personality and Social Psychology*, *69*(4), 719-727. https://doi.org/10.1037//0022-3514.69.4.719

Ryff, C. D., & Singer, B. H. (2008). Know thyself and become what you are: A eudaimonic approach to psychological well-being. *Journal of Happiness Studies*, *9*(1), 13-39. https://doi.org/10.1007/s10902-006-9019-0

Santos, A. C., Arriaga, P., Daniel, J. R., Cefai, C., Melo, M. H., Psyllou, A., Shieh, J-J., Schutte, N., Furtado, C., David, C. H., Azevedo, M. C., Andreou, E., & Simões, C. (2023). Social and emotional competencies as predictors of student engagement in youth: A cross-cultural multilevel study. *Studies in Higher Education*, *48*(1), 1-19. https://doi.org/10.1080/03075079.2022.2099370

Skinner, E. A., Kindermann, T. A., & Furrer, C. J. (2009). A motivational perspective on engagement and disaffection: Conceptualization and assessment of children's behavioral and emotional participation

in academic activities in the classroom. *Educational and psychological measurement*, *69*(3), 493-525. https://doi.org/10.1177/0013164408323233

Thapa, A., Cohen, J., Guffey, S., & Higgins-D'Alessandro, A. (2013). A review of school climate research. *Review of educational research*, *83*(3), 357-385. https://doi.org/10.3102/0034654313483907

Tomaszewski, W., Xiang, N., & Western, M. (2020). Student engagement as a mediator of the effects of socio-economic status on academic performance among secondary school students in Australia. *British Educational Research Journal*, *46*(3), 610-630. https://doi.org/10.1002/berj.3599

Wang, M. T., & Degol, J. L. (2016). School climate: A review of the construct, measurement, and impact on student outcomes. *Educational Psychology Review*, *28*(2), 315-352. https://doi.org/10.1007/s10648-015-9319-1

Wang, M. T., & Eccles, J. S. (2013). School context, achievement motivation, and academic engagement: A longitudinal study of school engagement using a multidimensional perspective. *Learning and Instruction*, *28*, 12-23. https://doi.org/10.1016/j.learninstruc.2013.04.002

Wong, Z. Y., & Liem, G. A. D. (2022). Student engagement: Current state of the construct, conceptual refinement, and future research directions. *Educational Psychology Review*, *34*(1), 107-138. https://doi.org/10.1007/s10648-021-09628-3

Zhang, L., Gao, S. Y., & Huang, J. H. (2024). Relationship between motivation for artistic activity engagement and happiness: Mediating role of perceived stress and moderating role of gender. *Current Psychology*, *43*(1), 618-630. https://doi.org/10.1007/s12144-023-04306-9

Publisher's Note: All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations or the publisher, the editors and the reviewers. Any product that may be evaluated in this article or claim made by its manufacturer is not guaranteed or endorsed by the publisher.

JADHUR

Vol.3, Issue.3, (2024)

Journal of Advances in Humanities Research

https://doi.org/10.56868/jadhur.v3i3.246

The Role of Digital Media in Shaping Public Relations: Developing Successful Online Communication Strategies for Enterprises

Ran An

School of Finance and Economics, Zhengzhou University of Science and Technology, 450064, Henan Province, P.R, China

Article Information

Article Type: Research Article

Dates:
Received: July 10 2024
Revised: August 28 2024
Accepted: September 05, 2024
Available online: September 15 2024

Copyright:

This work is licensed under creative common licensed ©2024

Correspondence to:

anran@zit.edu.cn

ABSTRACT

This systematic literature review explores the transformative impact of digital media on public relations (PR) strategies, focusing on real-time engagement, corporate reputation management, transparency, authenticity, and the strategic use of data and analytics. The study aims to identify enterprises' opportunities and challenges in adapting to the evolving digital PR landscape. Using PRISMA guidelines, a rigorous analysis of peer-reviewed articles published between 2010 and 2024 was conducted, resulting in a final synthesis of 110 studies. The findings underscore the pivotal role of digital media in redefining PR practices, particularly in enabling real-time crisis management and fostering corporate reputation through social media platforms. Transparency and authenticity emerged as critical drivers of successful PR strategies, meeting the growing consumer demand for openness and trustworthiness in brand communication. Furthermore, the strategic application of data and analytics was identified as essential for optimizing communication efforts, although striking a balance between quantitative metrics and qualitative insights remains a challenge. This review highlights the dual nature of digital media as both an opportunity and a challenge, urging enterprises to adopt agile, transparent, and ethical communication strategies to strengthen stakeholder relationships. The study emphasizes the necessity for continuous adaptation to the rapidly changing digital communication environment, offering practical implications for enterprises seeking to enhance their PR effectiveness.

Keywords: Digital Media, Public Relations, Crisis Management, Corporate Reputation, Transparency, Authenticity, Data Analytics, Social Media

1. INTRODUCTION

The rapid evolution of communication technologies has fundamentally reshaped the landscape of public relations (PR), with digital media taking center stage in how enterprises interact with their stakeholders (Fehrer et al., 2022). Traditionally, public relations relied heavily on print media, television, and radio, limiting the speed and scope of communication (Ausat, 2023). However, digital platforms like social media, blogs, and online news outlets have transformed the public relations dynamic. Enterprises can now engage with their audiences in real-time, across vast geographies, and in a much more personalized manner (Muth & Peter, 2023). This shift from traditional to digital media has not only altered public

relations strategies. Still, it has also made it imperative for businesses to develop effective online communication strategies to remain competitive and relevant in today's digital age (Joyce et al., 2024).

Interest in how digital media shapes the role of public relations has been a focus within both academic and professional contexts. Judging from the ability of social media platforms like Facebook, X (Previously known as Twitter), Instagram, and LinkedIn, introduced to enterprises to chat directly with their consumers through direct, two-way communication, public relations have become dynamic and interactive (Hatamleh et al., 2023). These platforms allow enterprises to reach audiences quickly, keep conversations going, answer questions, address concerns, and foster trust and loyalty with audiences. At the same time, the power of digital media has transformed the way PR is conducted, and now, it includes corporate reputation management, crisis communication, and brand development. As corporate messaging is increasingly indistinguishable from consumer feedback, companies have increasingly faced the tightrope of a rapidly complicating communication environment governed by transparency and responsiveness (Jungblut et al., 2024). While digital media has reached more and more recognition, the shift has confronted enterprises with new difficulties. Of course, it is faster and more accessible but also more volatile.

Digital platforms have speed and reach the extent that public relations crises can come fast and cause more damage to the company's reputation than ever (Purnama & Asdlori, 2023). While traditional PR models still relied on controlled and measured communication, digital media has seen that control decrease. Today, enterprises operate where consumers have a voice and can leave reviews, comment and even share such things on social media. This has rendered businesses in dire need of crafting PR strategies that are not only proactive but also highly flexible and reactive to the immediate feedback loop digital platforms offer (Arijeniwa & Nwaoboli, 2023).

In the face of these challenges, the current literature must offer more guidance on how enterprises can better do business in digital media. While previous studies have investigated the effects of digital media on overall public relations, more work needs to be done to elucidate how companies can systematically develop and carry out successful online communication strategies about their conditions and contexts (Utomo et al., 2023). This gap implies that there is scope to improve our understanding of how enterprises can adapt their communication practices to digital media disorders and, as such, promote engagement, reputation management, and crisis preparedness. In addition, enterprises also find themselves under pressure to reexamine their public relations strategies due to surging consumer preference for authenticity and transparency. Until recently, PR messages have tended to be single-track communications prepared by corporate teams to portray a particular image or message. However, digital media has changed this balance because of the consumer's side (Kim, 2020). Studies indicate that brands that manage to enter into conversations with their audiences (authentically and transparently) have greater chances of building strong relationships with them and gaining consumer trust (Gregory, 2020). However, that is only sometimes the case, as many enterprises still need help finding that fine line between keeping the messaging in check and allowing accurate, transparent communication with stakeholders (Jungblut et al., 2024). However, further research will explore ways companies can create more effective and balanced communication strategies by managing this tension between corporate control and consumer participation.

This study rigorously reviews the existing literature on the impact of digital media on public relations, assessing the abilities of enterprises to develop and execute effective online communication strategies. Many studies have tackled the role of particular digital media and public relations components—in such domains as brand communication or crisis management—but very few have synthesized these into

actionable pros and cons for businesses (Quesenberry, 2020; Liu et al., 2021; Vogler & Eisenegger, 2022). To provide such guidance, this study catalogues contemporary research and derives strategic, practical guidelines for enterprises to navigate digital media complexity in public relations. Focusing on real-time engagement strategies, enhancing corporate reputation through social media, increasing clarity of corporate behavior through transparency and authenticity, and using data analytics, this research offers enterprises clear and actionable frameworks to engage with through their communication strategies. With these recommendations, we hope to provide tools businesses can use to handle crises proactively, build trust with their stakeholders, and optimize their public relations outcomes in a digitalized world.

Unlike previous studies, this research goes beyond examining how digital media affects PR outcomes. It does not discuss the strategies but rather their practical application, which addresses the need to meet the evolving challenges of new media (Chen et al., 2023). With digital media increasingly integrated into business operations, enterprises need intelligent communication strategies to maintain a good reputation with their public, meaningfully engage their stakeholders, and efficiently deal with crises (Mahoney & Tang, 2024). However, to expect this type of paradigm shift is not because of a trend of digital engagement but rather a radical transformation of how businesses operate public relations in today's technology-advanced era. This study also denotes digital communication platforms' dynamic development, ongoing transformation, and how enterprises should recognize their public relations tactics (Men et al., 2023). This research combines a systematic literature review and strategic insights, providing businesses with actionable pathways to enhancing their PR practices in the constantly changing digital media landscape.

In this context, this study seeks to achieve the following objectives:

1. To systematically review and synthesize contemporary literature on the role of digital media in shaping public relations strategies for enterprises.
2. To develop actionable recommendations for businesses to navigate the evolving digital media landscape and enhance their public relations outcomes.

Based on these objectives, the study is guided by the following research questions:

1. How does digital media influence public relations practices and outcomes for enterprises?
2. What critical strategies can businesses adopt to enhance their online communication effectiveness?
3. How can enterprises leverage real-time engagement, corporate reputation building, transparency, and data analytics to improve public relations?

2. METHODOLOGY

This section outlines the systematic approach taken to conduct the literature review on the role of digital media in shaping public relations and developing successful online communication strategies for enterprises. The review followed rigorous standards to ensure the comprehensiveness and quality of the data extracted and analyzed. The study adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to maintain transparency and replicability throughout the review process.

2.1 Research Design

The research design of this paper is based on a systematic literature review (SLR), which provides a structured and transparent approach to collecting, evaluating, and synthesizing existing research on the role of digital media in public relations. The objective was to identify, appraise, and integrate findings from multiple studies to derive insights that can inform future PR practices in online communication strategies for enterprises. By employing SLR, the study ensures that the review process is methodologically robust, free from bias, and replicable. This design was chosen to offer a holistic view of the existing literature, filling the gaps in the knowledge regarding digital communication strategies in the context of public relations. Below is Figure 1. It Shows a Prisma diagram, which indicates the complete process of conducting the present study.

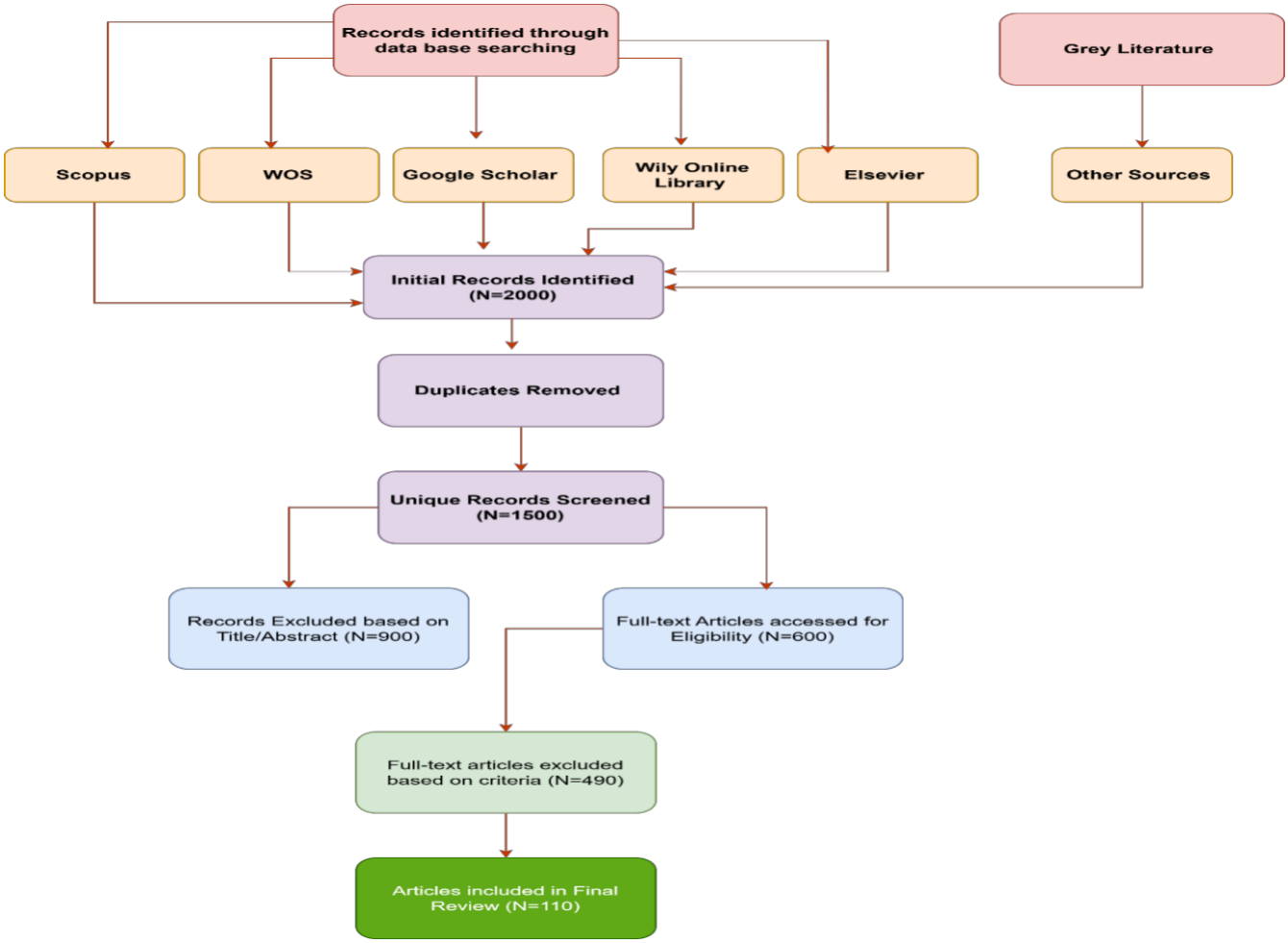

Figure 1. PRISMA Diagram

2.2 Search Strategy

To identify relevant literature, a systematic search was conducted using several academic databases, including Scopus, Web of Science, PubMed, and Google Scholar, as well as publisher databases such as Elsevier, Wiley Online Library, and SpringerLink. The search focused on articles published in English

between 2010 and 2024, considering that the significant evolution of digital media occurred during this period. Keywords used in the search strategy included "new media," "public relations," "online communication strategies," "digital communication," "corporate communication," "crisis communication," "reputation management," and "social media." Boolean operators (AND, OR) were employed to ensure comprehensive search results, and terms were combined to capture various studies relevant to the research question. The search strategy also involved manually screening the reference lists of included articles to identify additional studies that may not have appeared in the initial database search. Duplicate records were removed using reference management software (EndNote), and all identified studies were screened against predefined inclusion and exclusion criteria (detailed below).

2.3 Inclusion and Exclusion Criteria

A strict set of inclusion and exclusion criteria was applied to ensure the quality and relevance of the studies reviewed.

2.3.1. Inclusion criteria:

- Studies must examine the role of digital media in public relations or online communication strategies for enterprises.
- Research published between 2010 and 2024 to capture the most recent trends and technological advances.
- Peer-reviewed journal articles, conference proceedings, and book chapters contribute significant empirical or theoretical insights into digital PR.
- Articles are written in English to ensure consistency in data extraction and analysis.
- Studies that specifically focus on enterprises, excluding those centered solely on individuals or small non-commercial entities.
- Quantitative, qualitative, and mixed-methods studies were included to capture diverse research approaches.

2.3.2. Exclusion criteria:

- Studies published before 2010 are not foundational to developing digital media and public relations theories.
- Articles that primarily discuss traditional public relations methods without a focus on digital media or digital platforms.
- Studies that do not include public relations, online communication, or strategic communication for enterprises as core topics.
- Opinion pieces, editorials, news articles, or other non-peer-reviewed content.
- Articles must be available in full text or those behind paywalls with access to academic databases.
- After applying these criteria, 110 articles were deemed relevant for full-text review after removing duplicates and initial screening for relevance.

2.4 Data Extraction

The data extraction process was constructed carefully to achieve consistency, accuracy, and completeness of information from all studies included in this systematic review. A standardized data extraction form made the selected literature comparable, permitting the systematic collection of critical

details from each study. It contained several vital aspects, such as the author(s) and year of publishing, the title of the study, and, if appropriate, the country or region under consideration. The type of study (empirical, theoretical or case study) was also documented in addition to the research methodology applied (e.g. qualitative, quantitative or mixed methods). Further, for empirical studies, sample size was recorded if available. Specific interest areas such as crisis communication, corporate reputation management, or stakeholder engagement are mentioned for each study's central focus. Findings and conclusions were extracted from the study and expanded to demonstrate the study's contribution to understanding the act of digital media in public relations. Additionally, the firm revealed how each study's findings could be exploited by enterprises to develop communication strategies based on digital media, rounding out how digital media offerings affect the practice of PR.

Two researchers reviewed each article independently to make the data extraction process more reliable. Two reviewers encountered discrepancies and differences, which we discussed and agreed on. The combination of the two approaches increased the overall rigour of the data extraction process and ensured that the final data set reflected the contributions of the studies.

Table 1. Data Extraction Summary

Author(s) and Year of Publication	Title of the Study	Country or Region	Type of Study	Research Methodology	Sample Size (if applicable)	The focus of the study	Key Findings	Implications for Enterprise Communication Strategies	Quality Assessment Rating
Huang et al. (2023)	Cultivation via social media during the COVID-19	USA	Empirical	Quantitative	300 respondents	Corporate Reputation	Digital media enhances brand trust	Integrate digital media into PR plans	High
Fincham (2023)	Business as usual: How journalism	UK	Theoretical	Qualitative	N/A	Stakeholder Engagement	Enterprises must adapt to social media trends	Develop adaptive online strategies	Medium
Zilola et al. (2023)	Crisis Communication in the Digital Age	Global	Case Study	Mixed-methods	5 case studies	Crisis Management	Crisis communication is more effective with immediate responses	Prioritise real-time responses to crises	High

2.5 Quality Assessment

In order to maintain such a high standard of rigor in this systematic literature review, each included study was rigorously subjected to a comprehensive evaluation with well-established assessment tools. Qualitative studies were appraised using the Critical Appraisal Skills Program (CASP) checklist, and

quantitative studies were outlined using the Joanna Briggs Institute (JBI) checklist. These tools offered a framework to systematically evaluate each study's credibility, reliability, and methodological soundness. We assessed the various vital elements, including the appropriateness of the study design and the questions being asked. This also prevented studies with weak and irrelevant designs from entering the final synthesis. The quality assessment also examined transparency and resiliency in data collection and analysis methods. The clarity of their methodological approaches was used to rate studies so that the findings could be trusted. Moreover, the studies were scrutinized for relevance and originality to assess their contribution to understanding the use of digital media in the context of public relations and enterprise communication strategies. Among them was whether or not the study yielded new knowledge or maintained the current knowledge.

Sampling bias, researcher bias, and methodological limitations were all reviewed so that potential biases were kept to a minimum. As a result, the review assessed the reliability of each finding from each study. Furthermore, each study's results were evaluated to determine how generalizable each study's conclusions were, that is, how applicable the findings were to other contexts, such as other industries or geographical regions. This was crucial for broadly extending the review's conclusions to many enterprise settings. These criteria were used to rate each study as high, medium, or low quality. The final synthesis included only studies rated as high or medium quality, so the review was based on as credible and methodologically sound research as possible. The final discussion also used the quality ratings to weigh the studies such that higher quality studies had more significant weight in synthesizing findings. Applying this approach makes the systematic review conclusions based on valid evidence that pulls in the research's rigor and legitimacy.

2.6 Data Analysis

The data were analyzed using a thematic analysis approach, which allowed for identifying patterns and insights related to the study's objectives. The process began with an in-depth data review to achieve familiarization and identify initial ideas. The data were systematically coded manually to highlight recurring concepts and ideas associated with real-time engagement, corporate reputation, transparency, and the strategic use of data analytics in public relations. Thematic coding was performed iteratively to ensure consistency and capture all relevant information. The emerging themes were carefully reviewed and refined to ensure alignment with the study's research objectives and questions. Through this rigorous approach, the analysis facilitated a deeper understanding of how digital media shapes public relations strategies and allowed for developing actionable recommendations for enterprises. This manual thematic analysis ensured a systematic and reliable interpretation of the data, enabling meaningful insights into integrating digital media into public relations efforts.

3. RESULTS

The systematic review, the backbone of the work presented in this section, highlights vital findings; these themes are presented in a way that provides a broad overview of the literature on the use of digital media in influencing public relations and the development of successful online communication strategies for enterprises. Several prominent, though not exhaustive, themes have emerged through carefully synthesizing the selected studies, drawing attention to both the opportunities and difficulties presented by such digital media in corporate communication. This review identified themes consistent with the evolution of digital platforms and how enterprises manage their stakeholders more effectively.

3.1 Overview of Themes

The thematic analysis of the literature revealed four key themes that are pivotal to understanding how digital media is transforming public relations practices: On one hand, there are 'Real-Time Engagement and Crisis Management', and on the other hand, there are 'Building Corporate Reputation through Social Media', where social media plays a highly significant role. The significance of transparency and authenticity forms an axis and the data and analytics in PR form the fourth axis. These themes capture how enterprises manage the new trends in communication as the environment shifts to increased digitalization. Communication Style in Crisis addressed the need for timely and active communication during the crisis. New information comes with the speed of light when using social media; therefore, enterprises must engage with stakeholders quickly to avoid reputational risks to their businesses and ensure stakeholder trust. Engagement will improve acts and convert the management to proactive, taking acumen to prevent and respond to concerns promptly and protect the image of an organization.

The second theme aims to identify and understand how social media platforms such as X, Facebook and Instagram build Corporate Reputation. Many enterprises rely on SMM to shape and strengthen the organization's brand image and create sustainable customer relationships while enhancing the company's public image. The social media platform is highly interactive, so every business out there has a platform to communicate with their targeted audience directly and build further business loyalty. The Role of Transparency and Authenticity only emphasizes the ever-increasing consumer expectation to be told the truth. Openness is now a foundation in contemporary PR management styles as stakeholders demand that enterprises follow the guidelines of corporate transparency. Stakeholders should communicate similarly to what they usually say when talking to friends and family since it is genuine and does not erode the audience's trust as it creates lifelong customers. Firms that adopt these principles are in a much better place to build a credible relationship with their target market.

Finally, the strategic use of data and analytics in PR exemplifies how enterprises enhance the utilization of real-time information to improve communication tactics. Audience measurement and analytics help organizations assess the targeted audiences' activity and evaluate the campaigns' impact to make further adjustments. This integration enables companies to think systematically and get insights on the communication approaches to undertake and improve their PR practices in a contemporary emergent tech-occurring environment. Altogether, these themes describe how enterprises are astonishing the needs of the new world when it comes to the interaction with the target audience and strategies, which are decided with the help of digital media tools.

Table 2. Identified Themes

Theme	Description
Real-Time Engagement and Crisis Management	There is a need for immediate, real-time communication during crises to manage reputational risks.
Building Corporate Reputation through social media	Utilizing social media platforms to build and maintain corporate reputation.
The Role of Transparency and Authenticity	Open and honest communication is essential in fostering trust and loyalty.
The Strategic Use of Data and Analytics in PR	They are leveraging data and analytics to optimize communication strategies and measure impact.

3.2 Real-Time Engagement and Crisis Management

The intensity of crises requires that organizations engage stakeholders in real-time in the current digital world. X, Facebook, and Instagram, being real-time social media platforms, have brought new opportunities and challenges in managing crises for enterprises (Sharma et al., 2023). Critics assert that transitioning from a conventional, crisis-oriented response to a strategic, interactive approach is not an option but a reality, given the speed with which messages spread (Nizamidou, 2023). Leon-Silva and Perea-Khalifi's (2024) point of view indicates that social media has the potential to make crises go viral; therefore, when enterprises experience them, communication is needed without delay to address the issue. Contrary to the previous periods in business, when organizations could spend days responding to a crisis, today's technologies enforce actions in minutes, if not hours. According to Li (2023), delaying increases the potential for more harm through public reactions, wrong information, and damaged stakeholders' trust. Such rapid response expectations put enormous demands on organizations to design action and crisis management mechanisms with timely and practical information and communication technology.

On the other hand, some researchers discourage the adoption of high speed in notifying the public of incidents. According to Liu et al. (2023), although the speed of response is essential, it should not be at the expense of speed and well-thought-out content. Propaganda prepared quickly is counterproductive because it only fuels confusion and worsens matters. This speed and accuracy pressure is one of the facets of current crisis management. It is a fundamental problem for enterprises where an optimal balance has to be sought (Callaghan, 2016).

Nevertheless, there are obstacles to real-time engagement. According to Burston et al. (2015), the hurry to respond to some crises may have resulted in hasty decisions that compound the crisis or do not give the proper information, thereby prejudicing an organization's credibility. In this case, information must pass very quickly, and the quality of information must be attended to with great care. Of course, speed is essential, but organizations must ensure that their responses are accurate and reflect the known facts (Salhab et al., 2023). While social media is invaluable to crisis communication, reaching out to the public domain (e.g. releasing messages via social media) introduces risk: the spread and interpretation of an organization's message is no longer in the organization's control (Akhmetshin et al., 2019). While there are many challenges, research suggests that enterprises that quickly and transparently engage in real-time through crises better manage public perception and maintain trust (Callaghan, 2016). Real-time engagement helps organizations steer the story, debunk misdirection, and issue updates that forestall harmful repercussions (Blum et al., 2014). Real-time communication also allows enterprises to prove their transparency and responsiveness with strategic use (Burston et al., 2015).

3.3 Building Corporate Reputation through Social Media

Social media has fundamentally transformed enterprises, serving as a pivotal channel for engagement with consumers, stakeholders, and the broader public (Perera et al., 2023). Consequently, corporate reputation is increasingly being established and managed through these digital platforms. Platforms like X, Instagram, LinkedIn, and Facebook are interactive so that companies can create real-time, two-way conversations with their audiences, trust and loyalty (Armawan et al., 2023). Pakura and Rude Loff (2023) conclude that a brand now needs social media to have an identity to stand for, to focus on its values, to answer customer questions, and to control the public image. Enterprises can directly impact public opinion in a competitive digital world by carefully building their social media presence.

However, the challenges of corporate reputation building through social media are complemented by its benefits. As Khoso et al. (2022) put it, social media's sheer openness and immediacy make any misstep, be it an ill-worded post or an ad-hoc and sleepy response to a complaint, public. This demonstrates consistency and authenticity in a company's web communications (Li, 2023). The result is that brands can come under fire if they are perceived as inauthentic or unresponsive, putting them at risk of damaging their reputations. On the other hand, proactively and transparently engaging with companies maintains a good reputation. Social media also helps during times of crisis as it helps enterprises tackle the problems faced while handling public relations. A transparent and empathetic corporate reputation towards their audiences usually enhances credibility and relationship with the audience (Salhab et al., 2023). Consequently, social media becomes a strategic tool for corporate reputation amplification in terms of increased participation, quick response to public concerns, and synchronization of brand communication with the target audience's values (Garanti et al., 2022).

3.4 The Role of Transparency and Authenticity

Transparency and authenticity are foundational principles of effective communication in the digital age, particularly in public relations. In this study, transparency refers to openly sharing relevant information with stakeholders, allowing them to understand an organization's actions and decisions (Xu & Chang., 2023). Conversely, authenticity goes beyond transparency by embodying an organization's values and mission. These principles are critical for fostering stakeholder trust, loyalty, and credibility (Zheng et al., 2023).

A new requirement that stakeholders have come to demand and require enterprises is open communication and transparency, which social media invariably affords. For instance, Kiousis (2016) noted that transparency is essential when establishing trust rather than when trust has been established already. Regarding transitory reliability, an organization's perception of being transparent earns loyalty and prolonged relationships. However, according to Alyahia et al. (2024), authenticity is the perspective that goes beyond transparency. True self promises and delivers a credible image that can be trusted, making the various brands compelling to customers and stakeholders. It is common knowledge that transparency and authenticity are valuable in most little things, yet attaining these goals takes work. Jiang and Shen (2023) suggest that the stakeholders may perceive some of the information disclosed to the organizations as fake due to the disclosure of only favorable information to the organization. This move can be perilous since it threatens the confidence reposed in the organization and the worth that goes with it.

According to Gilpin (2010), the authenticity and all modes of communication should be as uniform as possible. It undermines stakeholders' confidence in using products associated with a brand that has hyped itself but needs better practice. As Badhwar et al. (2023) have pointed out, it is essential to understand that substantive actions taken by organizations during crises effectively protect their reputation from degradation or improvement; for instance, transparent and genuine crisis communication helps stakeholders feel appreciated, making them trust the organization.

3.5 The Strategic Use of Data and Analytics in Public Relations (PR)

In this research, data and analytics in strategic public relations implies integrating quantitative and qualitative data collection, analysis, and application in communication management and assessment. Audience measurement and analytics provide organizations with the tools to analyze the effectiveness of their public relations campaigns and make the necessary changes. These tools then allow enterprises to

address the audience's needs and expectations better and make PR practices more precise overall. Literature has noted significantly the revolutionary shift in PR due to data and analytics. Toteva (2023) opines that analytics offer valuable communication parameters, such as engagement activity rates, valence, and audience parameters, for fine-tuning an organization's communication plans. The above knowledge makes it easier for PR practitioners to avoid instinctive approaches and act instead on facts. Consequently, the increased opportunity allows the organization to track engagement, forecast audience behavior, and analyze the campaign's impact (Lacarcel & Huete, 2023).

However, data management in PR has its drawbacks because it may be strategic. Nnaji et al. (2024) note that communication on social media platforms has constantly produced large amounts of information and data, which is bulky if not well managed and analyzed. This data overload causes challenges to PR teams in trying to analyze data in a manner that yields insights they can apply in their work. Furthermore, Aljumah (2023) pointed out that quantitative data may contain significant information regarding the audience's behavior. However, it lacks the feelings and context in which people exist. This is mainly because strategies developed rely solely on the maximums and minimums and need a coping point for incorporating the experiences or feedback of consumers or audiences.

The other essential factor pertains to data security and sensitivity concerns. According to Al Adwan et al. (2023), organizations face several ethical issues related to using personal data. If such data is used or managed incorrectly, it causes the loss of people's confidence, and the organization's image will suffer. Based on such arguments, researchers state that there is a need to adopt a mixed methods approach in PR research. PR strategy needs to be based on data. However, the message needs to be created with people in mind, which is why Aljumah (2023) supports using data analytics alongside human-centered communication. Furthermore, organizations must have strong data management capabilities when dealing with vast amounts of data and ensuring that it does the right thing: being ethical and legal in handling data, especially for personal identification purposes (Liu et al., 2023).

3.6. Synthesis of the Themes

The four identified themes, Real-Time Engagement and Crisis Management, Building Corporate Reputation through social media, The Role of Transparency and Authenticity, and The Strategic Use of Data and Analytics in PR, are interconnected pillars essential for modern enterprises to navigate the complexities of digital public relations. Altogether, these concerns sum up how companies need to reinvent themselves to survive in a new age defined by the immediacy of the message, the response, and the demand for transparency. Live mapping has profoundly affected crisis management by elevating real-time engagement as the most practical method of dealing with reputational threats as they happen. Social networks have also become the most significant and unyielding influences on forming the corporate reputation, as they allow addressing the targeted audience and engaging in more personal communication with stakeholders. Transparency and authenticity also increase it, while creating trust and commitment increases the possibility that enterprises can continuously engage consumers over time in an increasingly noisy digital world.

Last but not least, data and analytics are the backbone of decisions at the business level, as it is possible to quantify communication impact and change processes if necessary. All these themes capture a matrix that enterprises need to embrace to sustain their competitiveness. The significance is the current and future necessity of satisfying specific interpersonal communication needs and the future sustainability and

necessarily accruing credibility of interpersonal communication technology. These themes are illustrated in the following diagram and their significance for enterprises in aggregate. Figure 2 below discusses the Synthesis of the Themes, specifically Integrating Key Themes for Effective Public Relations Strategies in the Digital Age.

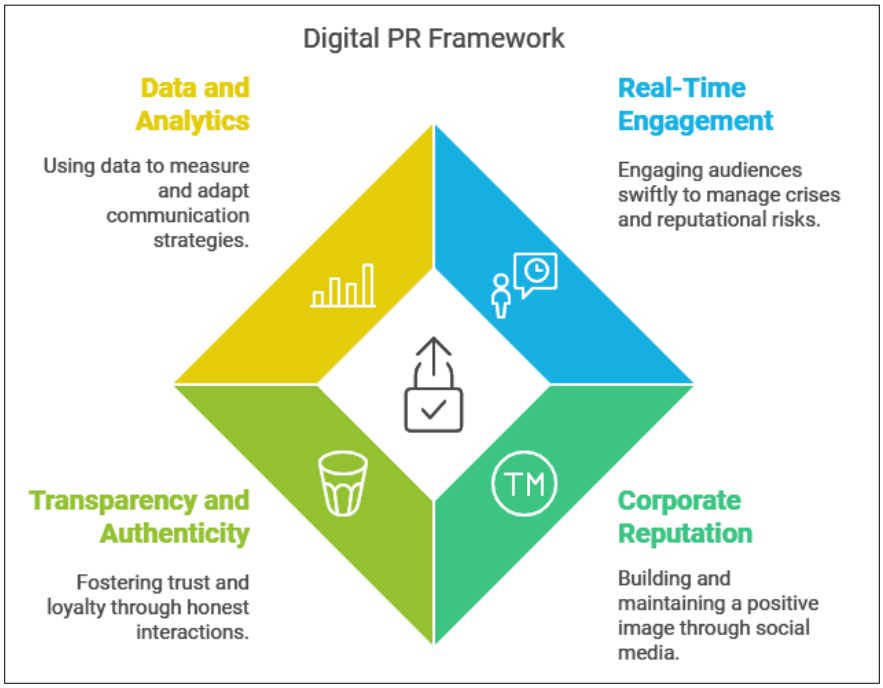

Figure 2. Integrating Key Themes for Effective Public Relations Strategies in the Digital Age

4. DISCUSSION

This systematic review reveals the transformative role of digital media in public relations (PR), as reflected in the key themes identified: Innovative Integrated Communication and its Application – When a Crisis Happens, Raising Corporate Image through X, Openness and Trustworthiness in PR and PR and Data Analysis – A Power Tool. In that context, it is possible to present the results of this research to answer the study's objectives and research questions to show how it is possible to deal with the challenges of digital PR for improving communication tactics and mitigating potential threats to the reputation of enterprises. Regarding real-time engagement and crisis management, one of the findings appears to be of paramount importance; namely, enterprises need to be able to prevent further deterioration of the situation and immediately address the issue not to harm their reputation. One lesson that stands out is how social media platforms require enterprises to change from response-based to response-as-it-happens-based engagement, whereby stakeholders' concerns are responded to as soon as they are aired. This concurs with Veil, Sellnow and Petrun's (2012) argument that enterprises have to design systems that can disseminate information in an instance to lessen the potential for reputational damage in crises. However, as Hatamleh et al. (2023) note, this focus may lead to fast but ineffective and potentially incomplete communication – an even worse situation. The implications of this research lie in the importance of concurrently achieving speed and accuracy in enterprises' real-time interactions to ensure that their fast, direct responses remain transparent to protect the enterprises' credible and trustworthy reputations in the long term.

Another identified issue concerns Building Corporate Reputation through social media, which explicitly underlines the ability of social media to shape and protect a company's image. The work established that enterprises engaging X (previously Twitter), Facebook, and Instagram successfully conduct outreach, create endearment, and influence perception. Thus, executing the studied line of thought poignant by Ausat (2023), social media is now critically central for enhancing corporate reputation. However, the study also outlines the risks of social media; as Liu et al. (2023) say, any single error can be quickly amplified; it requires continual and genuine engagement across all platforms. Trust and long-term relationships require parents' worthiness and authenticity. The theories further support the assertion that the competencies of stakeholders insist on open and truthful communication, which Kiousis (2016) associates with trust and continued interactions. However, Fehrer et al. (2022) explain that manipulative forms of transparency or false/dump can trigger adversities and public resistance. This paper also established that authenticity, as defined by the extent to which an enterprise reflects its core values, is equally essential for an enterprise in order to maintain loyalty and trust among stakeholders.

It also discusses The Strategic Use of Data and Analytics in PRs as a revolutionary tool for current communication management strategies. Organizations today turn to tracking and analyzing data as they look to drive their key performance indicators (KPIs), enhance their communication strategies, and even adjust their messages. Muth and Peter (2023) argue that for PR strategies to be effective, the strategy has to combine the best of both worlds: big data and a humanistic approach. Nonetheless, the results also point to data overload and ethical issues concerning data privacy. The PR practices discussed by Al Adwan et al. (2023) also raise the issue of data usage; therefore, the transparent use of the data is essential for trust and ethical overall practices.

5. CONCLUSION AND RECOMMENDATIONS

This systematic review of the PR trends in the last 15 years shows that digital media have dramatically influenced public relations. In addition to establishing a new state of PR, this research also offers specific guidelines for enterprises to function successfully in the contemporary communication environment. First, the results stress the importance of real-time communication, especially regarding crises. Since the timeliness of communication plays a vital role in managing the impact on the public, enterprises must be very proactive and open with information during such crises. To counter this, businesses ought to put considerable effort into adopting crisis communication structures and platforms that allow for timely while minimizing harmful message dissemination aimed at moderating reputational losses.

Second, having and sustaining a corporate reputation through social media entails the practice of corporate communication strategy, which is an issue of consistency and authenticity. The researchers recommend that enterprises have a well-defined social media presence and ensure that they synchronize when engaging on social media. Sustainability cannot be just an empty word – businesses must prove that they are sincere and consistent with the declared values to gain consumers' trust and devotion. Third, thanks to globalization and newborn technologies, the principles of openness and sincere conversation became non-optional for PR. To satisfy customer demands, enterprises must incorporate transparency across their communication mix so that all interaction is based and portrayed on ethical motives. These include equipping PR teams with tools and approaches to engage the stakeholders in meaningful two-way communication.

Last but not least, data and analytics provide enterprises with an exceptional opportunity to optimize communication plans and their outcomes with the help of insights into audience and campaign activities. Nevertheless, these numerically oriented analyses must be complemented with qualitative appreciation to guarantee the emotional and cultural relevancy of the organizations' strategies among targeted audiences. Also, these enterprises must report ethically on data usage, reporting how data is being gathered and used to foster trust.

6. LIMITATIONS AND FUTURE STUDIES

There are some limitations to the scope of the systematic review presented here. The review first took up only the studies published in English; thus, it missed the relevant research being developed in other languages. This opens the door for regional patterns to emerge, especially the views of global public relations practices. The review also focuses on literature published between 2010 and 2024, able to observe the most current trends but possibly need to be made aware of digital media's fundamental theories or earlier insights into the evolution of digital media in PR. The comparability of findings is also limited by the variability of the methodologies used in the studies.

Future research on these constraints will look at the research published in various languages and broaden the timeline to include early works for the digital transformation of PR. Additionally, more empirical studies are needed to explore specifically the challenges of managing massive-scale data that feature in PR and the ethical implications of data usage to build trust and transparency. Future research could also focus on sector-specific PR strategy, in which the stakes of transparency and real-time communication are even higher in industries like healthcare or finance. Examining the long-term impact of authenticity brand loyalty in urgent cultural contexts and the implications for managers could be valuable.

Acknowledgments: The author is thankful to the anonymous reviewers for their comments on the manuscript.
Author contributions: N/A
Ethical Statement: The School of Finance and Economics, Zhengzhou University of Science and Technology's research committee approved the research proposal. The procedures used in this study adhere to the principles of the Declaration of Helsinki.
Consent to Participate: N/A
Competing Interests: The author declares that this work has no competing interests.
Grant/Funding information: The author declared that no grants supported this work.
Data Availability Statement: The associated data is available upon request from the corresponding author.
Declaration Statement of Generative AI: The author did not use any AI tools during the preparation of this manuscript.

REFERENCES

Adwan, A.A., Kokash, H., Adwan, R.A. and Khattak, A. (2023) 'Data analytics in digital marketing for tracking the effectiveness of campaigns and inform strategy', *International Journal of Data and Network Science, 7*(2), pp. 563–574. https://doi.org/10.5267/j.ijdns.2023.3.015

Akhmetshin, E. M., Ilyina, I. A., Kulibanova, V. V., & Teor, T. R. (2019, April). "Employee Engagement" Management Facilitates the Recovery from Crisis Situations. In *2019 Communication strategies in digital society workshop (ComSDS)* (pp. 50-55). IEEE. https://doi.org/10.1109/COMSDS.2019.8709645

Aljumah, A., Nuseir, M., & Refae, G. (2023). Examining the effect of social media interaction, E-WOM, and public relations: Assessing the mediating role of brand awareness. *International Journal of Data and Network Science*, *7*(1), 467-476. https://doi.org/10.5267/j.ijdns.2022.8.012

Alyahia, M., Azazz, A. M. S., Fayyad, S., Elshaer, I. A., & Mohammad, A. A. A. (2024). Greenwashing Behavior in Hotels Industry: The Role of Green Transparency and Authenticity. *Sustainability, 16*(3), 1050. https://doi.org/10.3390/su16031050

Arijeniwa, A. F., & Nwaoboli, E. P. (2023). Setting agenda for public discourse: Examining the impact of social media on political participation amongst Nigerian youth. *International Journal of Arts, Humanities and Management Studies*, *10*(1), 36-53.

Armawan, I., Sudarmiatin, S., Hermawan, A., & Rahayu, W. (2023). The effect of social media marketing, SerQual, eWOM on purchase intention mediated by brand image and brand trust: Evidence from a black sweet coffee shop. *International Journal of Data and Network Science, 7*(1), 141-152. https://doi.org/10.5267/j.ijdns.2022.11.008

Ausat, A. M. A. (2023). The role of social media in shaping public opinion and its influence on economic decisions. *Technology and Society Perspectives (TACIT)*, *1*(1), 35-44. https://doi.org/10.61100/tacit.v1i1.37

Badhwar, A., Islam, S., & Tan, C. S. L. (2023). Exploring the potential of blockchain technology within the fashion and textile supply chain with a focus on traceability, transparency, and product authenticity: A systematic review. *Frontiers in Blockchain*, *6*, 1044723. https://doi.org/10.3389/fbloc.2023.1044723

Blum, J.R., Eichhorn, A., Smith, S. et al. Real-time emergency response: improved management of real-time information during crises. *J Multimodal User Interfaces 8*, 161–173 (2014). https://doi.org/10.1007/s12193-013-0139-7

Burston, J., Ware, D., & Tomlinson, R. (2015). The real-time needs of emergency managers for tropical cyclone storm tide forecasting: results of a participatory stakeholder engagement process. *Natural Hazards*, *78*, 1653-1668. https://doi.org/10.1007/s11069-015-1794-7

Callaghan, C. W. (2016). Disaster management, crowdsourced R&D and probabilistic innovation theory: Toward real-time disaster response capability. *International journal of disaster risk reduction*, *17*, 238-250. https://doi.org/10.1016/j.ijdrr.2016.05.004

Chen, Z. F., Ji, Y. G., & Men, L. R. (2023). Effective social media communication for startups in China: Antecedents and outcomes of organisation–public dialogic communication. *Digital Media & Society*, *25*(12), 3613-3640. https://doi.org/10.1177/146144482110519

DiStaso, M. W., & McCorkindale, T. (2012). Social media: uses and opportunities in public relations. *Global Media Journal*, 5(2), 75-82.

Fehrer, J. A., Baker, J. J., & Carroll, C. E. (2022). The role of public relations in shaping service ecosystems for social change. *Journal of Service Management*, *33*(4/5), 614-633. https://doi.org/10.1108/JOSM-01-2022-0044

Fincham, K. (2023). Business as usual: How journalism's professional logics continue to shape news organisation policies around social media audiences. *Journalism Practice*, *17*(7), 1482-1499. https://doi.org/10.1080/17512786.2021.1991437

Garanti, Z., Igbudu, N., Popoola, T., Vrontis, D., & Melanthiou, Y. (2022). Building corporate reputation through social media marketing efforts: the mediating role of corporate brand credibility. *International Journal of Internet Marketing and Advertising, 17*(3-4), 370-393. https://doi.org/10.1504/IJIMA.2022.126730

Hatamleh, I. H. M., Safari, A. O., Habes, M., Tahat, O., Ahmad, A. K., Abdallah, R. A. Q., & Aissani, R. (2023). trust in social media: Enhancing social relationships. *Social Sciences*, *12*(7), 416. https://doi.org/10.3390/socsci12070416

Huang, Q., Lynn, B. J., Dong, C., Ni, S., & Men, L. R. (2023). Relationship cultivation via social media during the COVID-19 pandemic: Evidence from China and the US. *International Journal of Business Communication*, *60*(2), 512-542. https://doi.org/10.1177/232948842110678

Jiang, H., & Shen, H. (2023). Toward a relational employee engagement theory: Understanding authenticity, transparency, and employee behaviours. *International Journal of Business Communication*, *60*(3), 948-975. https://doi.org/10.1177/232948842095423

Joyce, P. R., Selvaraj, F. J., Manoharan, G., Priya, C., Vijayalakshmi, R., Dwivedi, P. K., ... & Veerakumar, K. (2024). To Study The Role Of Marketing In Human Resource Management. *Migration Letters: An International Journal of Migration Studies*, *21*, 1191-1196.

Joyce, P. R., Selvaraj, F. J., Manoharan, G., Priya, C., Vijayalakshmi, R., Dwivedi, P. K., ... & Veerakumar, K. (2024). To Study The Role Of Marketing In Human Resource Management. *Migration Letters: An International Journal of Migration Studies*, Volume: 21, No: S2 (2024), 1191-1196.

Jungblut, M., Kümpel, A. S., & Steer, R. (2024). Social media use of the police in crises: A mixed-method study on communication practices of the German police. *Digital Media & Society*, *26*(8), 4647-4668. https://doi.org/10.1177/14614448221127899

Khoso, A. K., Darazi, M. A., Mahesar, K. A., Memon, M. A., & Nawaz, F. (2022). The impact of ESL teachers' emotional intelligence on ESL Students academic engagement, reading and writing proficiency: the mediating role of ESL student's motivation. *Int. J. Early Childhood Spec. Educ*, *14*, 3267-3280. https://doi.org/10.9756/INT-JECSE/V14I1.393

Khoso, A. K., Honggang, W., & Afzal, M. (2024). Unravelling the impact of Facebook addiction on EFL students: a dual lens on self-esteem and academic achievement. *Russian Law Journal, 12*(2), 1167-1187

Kim, C. M. (2020). *Social media campaigns: Strategies for public relations and marketing*. Routledge. 2nd Edition, https://doi.org/10.4324/9781003020196

Kiousis, S., Ragas, M. W., Kim, J. Y., Schweickart, T., Neil, J., & Kochhar, S. (2016). Presidential agenda building and policymaking: Examining linkages across three levels. *International Journal of Strategic Communication, 10*(1), 1-17. https://doi.org/10.1080/1553118X.2015.1090441

Lacarcel, F. J., & Huete, R. (2023). Digital communication strategies used by private companies, entrepreneurs, and public entities to attract long-stay tourists: a review. *International Entrepreneurship and Management Journal, 19*(2), 691-708. https://doi.org/10.1007/s11365-023-00843-8

Le, T.T. (2023), "Corporate social responsibility and SMEs' performance: mediating role of corporate image, corporate reputation and customer loyalty", *International Journal of Emerging Markets, 18*(10), 4565-4590. https://doi.org/10.1108/IJOEM-07-2021-1164

Leon-Silva, J. M., & Perea-Khalifi, D. (2024). Crisis management through citizen engagement on Twitter: The case of the covid-19 pandemic in Latin American municipalities. *International Public Management Journal*. Advance online publication. https://doi.org/10.1080/10967494.2024.2382733

Liu, H., Zhu, Q., Khoso, W. M., & Khoso, A. K. (2023). Spatial pattern and the development of green finance trends in China. *Renewable Energy*, *211*, 370-378. https://doi.org/10.1016/j.renene.2023.05.014

Macnamara, J., & Zerfass, A. (2017). Evaluation stasis continues in PR and corporate communication: Asia-Pacific insights into causes. *Communication research and practice*, *3*(4), 319-334. https://doi.org/10.1080/22041451.2017.1275258

Men, L. R., O'Neil, J., & Ewing, M. (2023). From the employee perspective: Organisations' administration of internal social media and the relationship between social media engagement and relationship cultivation. *International Journal of Business Communication*, *60*(2), 375-402. https://doi.org/10.1177/2329488420949968

Muth, L., & Peter, C. (2023). Social Media Influencers' Role in Shaping Political Opinions and Actions of Young Audiences. *Media and Communication*, *11*(3), 164-174. https://doi.org/10.17645/mac.v11i3.6750

Nizamidou, C. (2023). Resilience, crisis management and continuous improvement against the impact of COVID-19 on employees' engagement and emotions. Insights from a Cypriot SME. *Cogent Economics & Finance, 11*(2), 2282867. https://doi.org/10.1080/23322039.2023.2282867

Nnaji, U. O., Benjamin, L. B., Eyo-Udo, N. L., & Etukudoh, E. A. (2024). A review of strategic decision-making in marketing through big data and analytics. *Magna Scientia Advanced Research and Reviews*, *11*(1), 084-091. https://doi.org/10.51594/csitrj.v5i5.1139

Pakura, S., & Rudeloff, C. (2023). How entrepreneurs build brands and reputation with social media PR: empirical insights from startups in Germany. *Journal of Small Business & Entrepreneurship*, *35*(2), 153-180. https://doi.org/10.1080/08276331.2020.1728490

Perera, C. H., Nayak, R., & Nguyen, L. T. V. (2023). The impact of social media marketing and brand credibility on higher education institutes' brand equity in emerging countries. *Journal of Marketing Communications, 29*(8), 770-795. https://doi.org/10.1080/13527266.2022.2086284

Purnama, Y., & Asdlori, A. (2023). The Role of Social Media in Students' Social Perception and Interaction: Implications for Learning and Education. *Technology and Society Perspectives (TACIT)*, *1*(2), 45-55. https://doi.org/10.61100/tacit.v1i2.50

Quesenberry, K. A. (2020). *Social media strategy: Marketing, advertising, and public relations in the consumer revolution*. Rowman & Littlefield.

Salhab, H., Al-Amarneh, A., Aljabaly, S., Zoubi, M., & Othman, M. (2023). The impact of social media marketing on purchase intention: The mediating role of brand trust and image. *International Journal of Data and Network Science*, *7*(2), 591-600. https://doi.org/10.5267/j.ijdns.2023.3.012

Sharma, V., Srinivasan, S., Ranganathan, C. S., Latha, N., & Visuvanathan, G. E. (2023, August). Real-time Monitoring of Women's Safety Through Bluetooth Low Energy and iBeacons. In *2023 Second International Conference On Smart Technologies For Smart Nation (SmartTechCon)* (pp. 1282-1287). IEEE. https://doi.org/10.1109/SmartTechCon57526.2023.10391725

Toteva, M. (2023). Revolutionizing Education: The Transformative Power of AI Technologies in PR. *Проблеми на постмодерността*, *13*(3), 307-320.

Utomo, S. B., Nugraha, J. P., Indrapraja, R., & Panjaitan, F. A. B. K. (2023). Analysis of The Effectiveness of Integrated Digital Marketing Communication Strategies in Building MSMEs Brand Awareness Through Social Media. *Jurnal Sistim Informasi dan Teknologi*, Advance Online Publication. https://doi.org/10.60083/jsisfotek.v5i4.311

Veil, S. R., Sellnow, T. L., & Petrun, E. L. (2012). Management Communication. *Management Communication Quarterly*, *26*(2), 322-345. https://doi.org/10.1177/0893318911426685

Vogler, D., & Eisenegger, M. (2021). CSR communication, corporate reputation, and the role of the news media as an agenda-setter in the digital age. *Business & Society, 60*(8), 1957-1986. https://doi.org/10.1177/00076503209289

Xu, H., & Chang, B. (2023). Goodwill or just for show? The effects of different corporate social justice statements and the role of perceived authenticity. *Journal of Communication Management, 27*(4), 493-521. https://doi.org/10.1108/JCOM-09-2022-0105

Zheng, Q., Dong, C., & Zhang, Y. (2023). When relational transparency backfires: examining the various impacts of authentic leadership on employee trust during the COVID-19 pandemic. Corporate Communications: An International Journal, ahead-of-print. https://doi.org/10.1108/CCIJ-05-2023-0066

Zilola, A., Barchinoy, N., & Muhammad, F. (2023). The Role of media in Influencing culture and Society. *Journal of Academic Research and Trends in Educational Sciences*, *2*(2), 190-197. https://creativecommons.org/licenses/by/4.0/deed.ru

Publisher's Note: All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations or the publisher, the editors and the reviewers. Any product that may be evaluated in this article or claim made by its manufacturer is not guaranteed or endorsed by the publisher.

JADHUR

Vol.3, Issue.3, (2024)

Journal of Advances in Humanities Research

https://doi.org/10.56868/jadhur.v3i3.245

Artificial Intelligence (AI) and Augmented Reality (AR) in Preschool Education: Innovative Applications

Dan Wang

Faculty of Educational Studies, Urban Vocational College of Sichuan, Chengdu, China

Article Information

Article Type: Research Article

Dates:
Received: 05 July 2024
Revised: 10 September 2024
Accepted: 18 September 2024
Available online: 20 September 2024

Copyright:

This work is licensed under creative common licensed ©2024

Correspondence to:

Dan Wang
dannawang89@gmail.com
ORCID: https://orcid.org/0000-0002-9453-5609

ABSTRACT

This study examines how artificial intelligence (AI), Personalization, problem-solving, and augmented reality (AR) technology affect educational outcomes. The rising use of digital technology in education requires understanding how it affects learning to design successful teaching practices. Analyzing student and instructor data using structural equation modelling creates a strong framework for exploring key construct interrelationships. The study focuses on six primary constructs: AI Personalization (AIP), AI Problem Solving (AIPS), Augmented Reality Creativity Enhancement (ARCE), Augmented Reality Engagement (ARE), Augmented Reality Social Interaction (ARSI), and Learning Outcomes (LOS). These three dimensions are positively connected, showing that strategic AI and AR applications in education could transform the experience. These associations were assessed using path analysis on 357 preschool instructors' survey responses. Results show a favourable association between AI personalization, AR engagement, ARCE, and ARSI ($t = 7.947$, $p < 0.001$). AIPS, ARCE, and ARSI have significant beta values ($p < 0.001$): $\beta = 0.331$, $\beta = 0.559$, and $\beta = 0.227$, indicating that LOS directly impacts these variables. Interaction effects show that LOS moderates the connection between AIP, AIPS, are-ARCE, and ARSI, but not ARSI ($\beta = -0.116$, $p < 0.001$; $\beta = 0.106$, $p = 0.026$; $\beta = 0.082$, $p = 0.086$. This study has implications for educators, policymakers, and developers who want to learn how to use AI-AR to engage and delight children in learning. These findings feed training and resources to improve early learning with these technologies.

Keywords: Artificial Intelligence, Augmented Reality, Education Technology, Learning Outcomes, Personalization, Problem-Solving, Creativity Enhancement

1. INTRODUCTION

Artificial intelligence (AI) has multiple advantages in personalized learning. Personalized approaches increase student motivation and participation as learners receive tailored feedback and resources that resonate with their interests (Kaswan et al., 2024). AI technologies are particularly beneficial for special education, providing targeted interventions that cater to unique learning challenges (Askarova et al., 2024).

An effective use of AI in education requires significant infrastructure, teacher training, and attention to data privacy concerns (Katiyar et al., 2024; Yılmaz, 2024). Ethical considerations regarding potential biases in AI algorithms must be addressed to ensure fair access to personalized learning opportunities (Kaswan et al., 2024). One of the primary concerns with AI and AR in preschool education is the potential for excessive screen time, which has been linked to adverse effects on young children's health, including impacts on sleep patterns and physical activity levels. Children are frequently exposed to screens as early as 7 to 12 months, with daily usage surpassing recommended limits. Television is the most common screen type, often used during meals or while parents are occupied (Madžar et al., 2024). Excessive screen time is linked to poor sleep quality and duration, exacerbating behavioural and cognitive issues (Merín et al., 2024). Prolonged screen exposure negatively affects attention, language, and motor skills while also increasing risks of obesity and mental health issues (Luiz et al., 2023). Innovative solutions like the Kid Space system have shown promise in alleviating parental concerns about screen time by integrating educational technology with physical activities. Conversely, while excessive screen time poses risks, some studies suggest that when used appropriately, digital tools can enhance learning experiences and engagement in preschool settings, indicating a need for balanced approaches to technology use in early childhood education.

Emerging technologies like artificial intelligence (AI) and augmented reality (AR) are integrated into early childhood education practices outside of the mainstream. New possibilities are being introduced for building individualized, exciting, engaging, and immersive learning experiences designed to meet the varied development needs of young children using these technologies. AI is so flexible that it can create different learning experiences for every child as they move through constantly changing content in real time, which is dictated by performance. More specifically, this Personalization is exceptionally well suited for preschool education, as children in this age group develop their cognitive and social abilities at different speeds (Chen et al., 2020). Likewise, AR transforms abstract ideas into real, interactive experiences to use with their sense-making (Khan et al., 2019).

More than any other application of AI in education, they personalize learning. Given preschool children, this individualized attention is critical as the early problem-solving and critical thinking experiences are the foundation of their learning later (Chen et al., 2020). AI-based platforms consume real-time data on children’s behaviours on educational content, which is then analyzed by the platform, and tasks and the amount of feedback are adjusted, as well as new learning materials being suggested based on the needs of each child’s learner. Beyond this, AI can teach children to understand and learn problem-solving because it allows them to solve tasks at an ability level to feel confident and persistent (Kuchkarova et al., 2024).

Augmented reality (AR) is interactive learning that adds digital information to the physical world. This allows children to understand complex ideas more easily through visualization and interaction with the ideas in a three-dimensional space (Avila-Garzon et al., 2021). AR bridges preschoolers' creative thoughts and real-world applications, which are vivid and highly active. ARs are immersive by nature, so children can create virtual objects, interact with a story, or solve problems in ways that are not possible through traditional learning. On the other hand, the collaborative potential of AR makes it possible to improve social skills by providing the possibility of working together with children who need to work together to achieve a common goal (Iqbal et al., 2022).

AI and AR directly benefit children's development, and broader learning outcomes may enhance or moderate their effectiveness. The cumulative effect of educational experiences on children's cognitive, social, and emotional development is reflected in overall learning outcomes. These outcomes mediate the relationship between AI/AR interventions and the skills they are intended to improve (Kuchkarova et al., 2024).

The present study investigates how AI personalization and AR engagement help children learn problem-solving, creativity, and social skills and how learning outcomes affect them. That is the main objective of the study. The empirically of the study is the uniqueness of the study. Limited existing literature regarding the impact of AI and AR on preschool education underscores the study. The existing research gap is the need for more research on adopting AI and AR, and studies need to examine practitioners' perspectives on utilizing these technologies in preschool education. This gap indicates the necessity for further research to provide insights into the benefits, limitations, and practical implementation of AI and AR in early childhood education. This study presents a novel approach by providing specific insights from a sample of experienced professionals across diverse learning environments, contributing new information to the limited literature on adopting AI and AR in early education.

2. LITERATURE REVIEW

2.1 AI in Education: Personalization and Learning Outcomes

Artificial intelligence enhances education by providing tailored learning experiences for individual students. In this case, Personalization refers to the customization of educational materials to align with the learner's learning mode and pace. AI is utilized to recognize student interactions, and based on their developmental stage, key characteristics are identified to update the content within the dialogue system (Chen et al., 2020). Such an approach to learning is advantageous to preschoolers, as their learning capabilities differ from one child to another.

In the past, we have learned that AI personalization enables students to enhance their problem-solving skills by providing them with problems they can solve based on their understanding. Artificial intelligence in students' learning makes them try various scenarios of tackling issues and improving their decision-making processes (Kuchkarova et al., 2024). Further, AI can give prompt feedback and monitor a student's progress; this way, children can learn with their errors and at their own pace (Chen et al., 2020). Moreover, AI can contribute to the formation of conditions for collective learning. For example, using AI, the systems can run through collaborative problem-solving scenarios where students can be studied from the perspective of communication and teamwork (Khan et al., 2019). These technologies let you mimic social interactions you can engage in when it is safe.

2.2 AR in Education: Engagement and Interactivity

Augmented Reality (AR) opens up the opportunity for a tremendous new way to interact with young learners by integrating the digital and real world. The high interaction provided by AR behind overlapped 3D visual objects in natural spaces increases children's imagination and curiosity (Avila-Garzon et al., 2021). Especially for preschool children, this interactivity is essential since older children have sensory-based experiences and play-based learning, so they help them in cognitive and social development.

As proven, the use of AR enhances creativity very well. This includes AR-based storytelling, where building up virtual characters and environments encourages children to be actively involved in the learning process, and they can provide the ability to explore creatively and help them in problem-solving (Iqbal et al., 2022). Additionally, AR can keep the children focused while immersing them in new learning activities, which means that the knowledge is retained much better than it would be if learning traditionally (Khan et al., 2019).

AR shows excellent promise in social skill development. It is common for AR applications to be collaborative activities where students work together in order to complete a task. However, peer learning is attended by participating in the collaboration, which allows the children to learn how to communicate and submit with their classmates (Iqbal et al., 2022). The ability of AR to create opportunities for children to participate in group activities in a safe context provides a means for children to develop critical social skills vital to success in any academic or personal context.

2.3 The Role of Learning Outcomes in AI and AR Applications

The effectiveness of AI and AR applications in education depends upon how well the learning outcomes can be attained. Although both technologies may help develop some skills, such as problem-solving, creativity, and social interaction, the overall learning outcomes produced by these tools may either magnify these effects or counteract them. The more AI and AR benefit specific educational goals, the more pronounced the benefits of AI and AR are when learning outcomes are improved (Kuchkarova et al., 2024).

Moderation models have been applied in educational research to explore the association between educational treatments and skills and how the learning results affect that association. In this regard, learning outcomes moderate the direct effects of AI personalization and AR engagement on children's solving, creativity and social skills. By understanding the mediating variable of learning outcomes, educators and policymakers can develop better educational interventions for using AI and AR technologies in a way that will yield the highest possible benefits.

After exploring the previous literature, the following research hypothesis regarding the direct and moderated effects of AI and AR on preschoolers' learning outcomes will be tested using quantitative data collected from preschool educators.

H1: Preschool children’s problem-solving abilities are positively associated with AI personalization

H2: Preschool children's creativity enhancement is significant and is positively correlated to AR engagement.

H3: There is a positive correlation between AR engagement and preschool children's social skill level.

H4: Learning outcomes moderates the relationship between problem-solving skills in children and AI Personalization.

H5: Learning outcomes moderates the relationship between creativity enhancement and AR engagement.

H6: Preschool children's general learning outcomes moderate the relationship between AR engagement and social skill development.

2.4 Conceptual Framework of the Study

The conceptual framework, as depicted in Figure 1, explains how AI Personalization and AR Engagement might help kids learn. These technologies encourage problem-solving, creativity, and social skills to improve learning settings and fulfill individual needs. Firstly, AI Personalization adapts education content to learners' abilities, preferences, and rates. AI-delivered educational information and challenging tasks boost students' cognitive and problem-solving skills. The framework requires AI to make learning fun and help kids solve challenges. Personalized instruction challenges and supports students' strengths and weaknesses.

Secondly, AR Engagement immerses students in interactive virtual worlds. This participation stimulates creativity. AR lets students visualize concepts and collaborate with virtual aspects that traditional teaching cannot. AR helps youngsters think creatively, apply concepts in new ways, and think beyond the box. According to the framework, AR helps students understand and use material creatively and realistically to build advanced thinking skills.

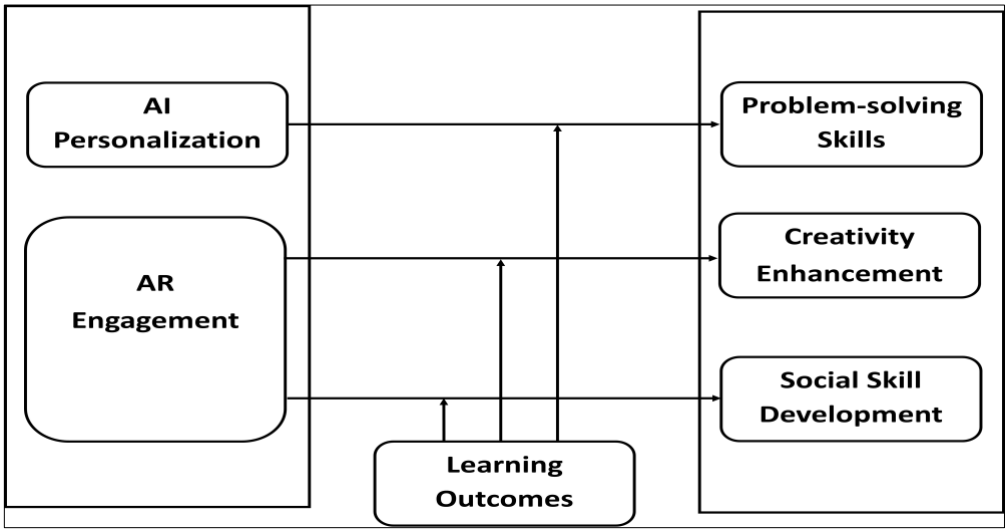

Figure 1: Conceptual Framework

Alternative social skill development methods include AI and AR. The personalized approach of AI may replicate interactive situations where students interact with people (or AI agents) in problem-solving contexts to improve social and communication skills. Teamwork is common in AR group learning and virtual problem-solving. AR promotes teamwork, interaction, and peer learning, which improves students' social skills. This strategy emphasizes learning results that moderate AI personalization and AR engagement. Enhancing knowledge and skill acquisition improves instruction and increases these technologies' impact on students' growth. Thus, better learning outcomes boost creativity, problem-solving, and social skills. Current educational methods like AI and AR turn learning into life skills.

3. METHODOLOGY

3.1 Research Design

This study employed a quantitative research design, and structured questionnaires were administered to preschool teachers. The study aimed to analyze the effect of AI-based Personalization and AR interaction on problem-solving, creativity, social skills, and learning outcomes, which were used as a mediator variable. The analysis of direct and mediated effects on the data was done using Structural Equation Modelling (SEM) with the Partial Least Squares (PLS) estimation method.

3.2 Participants

We recruited 357 preschool educators from various educational institutions across urban and rural Guiyang (the capital of Guizhou province) of the People's Republic of China. Educators were selected from schools that had actively integrated AI and AR tools into their teaching practices, ensuring that the participants were well-suited to provide grounded insights into the effects of these technologies in preschool education. The sampling technique used was purposive sampling, as the selection focused specifically on educators with experience in AI and AR applications in the classroom. This technique ensured that participants had sufficient familiarity with these technologies to contribute valuable, informed perspectives. The sample size of 357 educators was chosen to ensure a robust and diverse representation of views, accommodating the anticipated differences in perspectives between urban and rural educators.

3.3 Data Collection

The questionnaire was designed in two languages: Chinese and English. A Likert scale of 5 was utilized to assess educators' satisfaction with incorporating AI and AR in preschool education, allowing them to select from the following responses: strongly disagree, disagree, neutral, agree, and highly agree. The questionnaire was generated electronically and disseminated via WeChat, email, Google Forms, and other comparable online platforms. The response rate attained in this poll was 75% (i.e., 357 respondents). In actuality, the questionnaire was sent to 476 respondents. The purposive sample strategy was employed to choose individuals with prior experience in AI/AR within teaching practice. A purposive sampling technique was utilized to collect data. The data was collected with a structured questionnaire that included items on AI personalization, AR engagement, problem-solving, creativity, social skills, and learning outcomes. The questions for the questionnaire were derived from validated scales used in prior research (Chen et al., 2020; Khan et al., 2019; Kuchkarova et al., 2024). The items were measured using a five-point Likert scale where one was assigned to 'strongly disagree' and 5 to 'strongly agree'.

3.4 Measurement Scales and Items

The constructs used in the study, along with the measurement scales and items, are given in Table 1.

Table 1: The Constructs Used in the Study

Scale	Dimension	Items	Reference
AI Personalization Scale (AIP)	Personalization	AIP1: AI-assisted in developing learning programmes catering to each student's needs.	(Chen et al., 2020)
		AIP2: The AI platform adapts the content depending on the child's performance in the particular activity.	
		AIP3: Understanding with the help of AI enhances children's learning capacity.	
		AIP4: The AI platform provides feedback on the child's learning style.	
AR Engagement Scale (ARE)	Engagement	ARE1: AR tools are more effective for children to learn than other forms of learning because they are more entertaining.	(Khan et al., 2019)
		ARE2: In the case of AR, students develop an interest in subjects.	
		ARE3: Other approaches could capture children's interest more effectively, and neither does an AR-based lesson.	
		ARE4: AR in teaching is used to encourage active participation.	
AR Social Interaction Scale (ARSI)	Social Interaction	ARSI1: Collaboration among students is encouraged by AR activities.	(Iqbal et al., 2022)
		ARSI2: AR tools help to improve social interaction skills.	
		ARSI3: When using AR applications, children often work together.	
		ARSI4: AR tools help in peer learning in group activities.	
Learning Outcomes Scale (LOS)	Learning Outcomes	LOS1: AI and AR technologies help children solve problems.	(Kuchkarova et al., 2024)
		LOS2: When AI and AR are combined, children have a higher knowledge retention.	
		LOS3: AI and AR technologies help children be creative and curious.	
		LOS4: Using AI and AR applications, students show improved social skills.	
AR Creativity Enhancement Scale (ARCE)	Creativity Enhancement	ARCE1: AR tools make children more creative in their learning tasks.	(Avila-Garzon et al., 2021)
		ARCE2: The AR elements are also active; for example, some three-dimensional models stimulate children's imaginations.	

		ARCE3: AR is applied to enable children to think outside the box to solve various problems.	
		ARCE4: Interactive AR-based storytelling can make a child imagine and be creative.	
AI Problem-Solving Scale (AIPS)	Problem-Solving	AIPS1: Learning activities that have been developed using artificial intelligence assist children to solve problems.	(Luckin et al., 2022)
		AIPS2: The opportunities for learning provided by the AI platform are to encourage children to think.	
		AIPS3: AI-based tools assist children in learning how to solve problems correctly.	
		AIPS4: AI-assisted lessons enable children to use problem-solving strategies in solving problems.	

The above table shows the measurement scales and research items on multiple dimensions of AI and AR in education. The scales focus on the nature of AI personalization, how engaging learners are with AR, the social aspect of interaction with AR, the impact of AR on creative abilities, the effectiveness of learning, and how learners experience problem-solving in educational settings.

The Personalization using AI Tools for Students (PAI) scale gauges the extent to which AI instruments individualize student learning. The items relate to AI's ability to deliver differentiated instruction, adjust content delivery according to student progress, enhance higher-order thinking skills, and give feedback. They are inspired by Luckin et al. (2022) and describe the growing use of AI in developing responsive learning contexts.

The AR Engagement Scale (ARE) is centred on enhancing engagement and interactivity in learning through augmented reality tools. According to Khan et al. (2019), items in this scale show that the application of AR technology offers a more engaging way to capture the students' attention compared to traditional forms of teaching, enhances the students' interest in subjects, and promotes participation.

The AR Social Interaction Scale (ARSI) assesses AR's role in maintaining social interaction in students. According to the study by Iqbal et al. (2022), the scale items are based on the degree to which AR tools enhance collaborative spirit, interpersonal communication skills, and group learning during group tasks.

The Learning Outcomes Scale (LOS) captures the impact of AI/AR learning on children's learning outcomes. According to (Kuchkarova et al., 2024), the items reflect changes in problem-solving capability, knowledge enhancement, innovativeness, curiosity and social skills when AI and AR are integrated into the learning process. The AR Creativity Enhancement Scale (ARCE) captures the impact of AR on children's creativity. As pointed out by (Avila-Garzon et al., 2021), the items derived from AR tools foster creativity by using appealing 3D models and storytelling and enhancing children's motivation and learning when solving tasks.

The AI Problem Solving Scale (AIPS) is the long overdue measurement of the contribution of AI in the problem-solving aspects of learning. The tools that use AI in learning are described in the study by (Luckin et al., 2022) as posing the challenge that orients learners to think critically, increases the efficiency of problem-solving, and refines strategies of learning activities. The interaction of these scales provides an overview of how AI and AR technologies influence the multiple educational results of Personalization and interest, social interaction, creativity, and problem-solving.

3.5 Pre-PLS Analysis

Before data analysis, multiple assumptions about PLS-SEM data suitability and robustness were evaluated. External validity is predicated on enough sample size, data normality, construct linearity, and no multicollinearity. Following PLS-SEM recommendations, the sample size was sufficient to capture significant effects in the proposed model. A skewness and kurtosis test assessed normalcy and identified variable outliers that could harm the inquiry. Linear construct interactions were also verified for path coefficient estimation. All model predictors' variance inflation factor (VIF) is assessed simultaneously. VIF values below 5 suggest multicollinearity factor independence.

3.6 Data Analysis

The data were analyzed using Partial Least Squares Structural Equation Modelling (PLS-SEM) to examine the direct and mediated relationships between the constructs of interest. It was chosen because PLS-SEM is suitable for multiple dependent variables, and the data does not have to be normally distributed. The analysis was conducted in two stages: The first involved assessing the measurement model's psychometric properties, and the second involved examining the structural model to confirm the proposed relationship.

3.7 Validity and Reliability

Both convergent and discriminant validity were examined to assess the validity of the employed constructs. Convergent validity was assessed by examining factor loadings, composite reliability, and average variance extracted for each construct. High factor loadings were defined as those exceeding 0.7, with composite reliability above 0.7 and average variance extracted greater than 0.5. Two diagnostic tests were performed to assess discriminant validity. The Fornell and Larcker (1981) criterion evaluates the ratio of the square root of the Average Variance Extracted (AVE) to the maximum correlation between a construct and other constructs. An HTMT ratio exceeding 0.9 indicates acceptable discriminant validity. Reliability was assessed using Cronbach’s alpha, revealing acceptable alpha coefficients exceeding .70, indicating that the measurement instrument is reliable and internally consistent.

3.8 Ethical Consideration

This research upheld participants' rights by adhering to privacy, confidentiality, and self-determination principles. All participants recruited for the study were provided with descriptive information, and written informed consent was obtained from them to participate.

4. RESULTS

4.1 Demographics of the Respondents

This study included a sample of 357 educators, categorized by gender, age, education level, and years of teaching experience. The sample comprised 68% females and 32% males. Of the participants, 56% identified as multi-national. Age distribution revealed that 25% were 20-29, 40% were 30-39, 22% were 40-49, and 13% were 50 or older. Regarding academic qualifications, 45% of individuals possessed at least a Master's degree, 35% held a Bachelor's degree, 10% attained a Doctorate, and 10% received a diploma, certificate, or other related certification. Teaching experience varied as follows: 18% reported less than five years, 30% between five and ten years, 35% between eleven and twenty years, and 17% more than twenty years.

4.2 Convergent Validity of Constructs in the Study

Table 2 shows the convergent validity of AI personalization, AR, and learning findings. Convergent validity requires that two measures of the same construct be connected. This is done using statistical coefficients, including loadings, Cronbach's Alpha (α), Composite Reliability (CR), and Average Variance Extracted (AVE). Many elements are used to evaluate each construct with varied loadings. Loadings exceeding 0.7 indicate substantial mapping between items and constructs. AI personalization piece AIP1 strongly connects with the construct with a loading of 0.901. AIP2 (0.854) and AIP3 (0.774) have strong associations, but AIP4 (0.685) is slightly below the acceptable floor, suggesting it may be less beneficial in AI personalization.

Cronbach's Alpha and Composite dependability assess construct reliability. AI Personalization has a Cronbach's Alpha exceeds 0.7, with α = 0.931, CR = 0.951, and AVE = 0.829. These findings show well-defined, reliable, and convergent AI personalization. Other constructs (AR Engagement, α = 0.908, CR = 0.936, and AVE = 0.785) also show validity and reliability. Although the α value of 0.818 is favorable for Learning Outcomes, the AVE of 0.649 falls below the acceptable threshold of 0.7, indicating limitations in capturing the construct's variance. Measurement of learning outcomes may be improved. Table 2 shows that AI personalization, AR creativity improvement, AR engagement, and AR social interaction have high loadings, Cronbach's Alpha, and Composite Reliability values, indicating convergent validity. Learning Outcomes need improvement to capture the full range of this key statistic, as its AVE illustrates. The data validates the study paradigm by confirming that the construct measurement items work.

Table 2: Convergent validity

Constructs	Items	Loadings	Alpha	CR	AVE
AI Personalization	AIP1	0.901	0.931	0.951	0.829
	AIP2	0.854			
	AIP3	0.774			
	AIP4	0.685			
AI Problem-Solving	AIPS1	0.784	0.869	0.911	0.720
	AIPS2	0.834			

	AIPS3	0.921			
	AIPS4	0.849			
AR Creativity Enhancement	ARCE1	0.837	0.868	0.910	0.716
	ARCE2	0.852			
	ARCE3	0.860			
	ARCE4	0.836			
AR Engagement	ARE1	0.890	0.908	0.936	0.785
	ARE2	0.934			
	ARE3	0.923			
	ARE4	0.893			
AR Social Interaction	ARSI1	0.941	0.880	0.919	0.743
	ARSI2	0.859			
	ARSI3	0.912			
	ARSI4	0.716			
Learning Outcomes	LOS1	0.855	0.818	0.880	0.649
	LOS2	0.922			
	LOS3	0.878			
	LOS4	0.888			

4.3 Construct Discriminant Validity: Fornell-Larcker Criterion

Table 3 shows the Fornell-Larcker criterion results for the study's operationalized constructs' discriminant validity. Discriminant validation evaluates whether concepts or measurements should be distinct. This table shows the square root of the Average Variance Extracted for each construct as diagonal values and construct correlations as off-diagonal values. Each construct has a strong relationship with itself, indicating internal consistency, as seen by diagonal values. AI Personalization (AIP) and Learning Outcomes (LOS) have square roots of AVE of 0.808 and 0.886, respectively, indicating that these constructs may represent their underlying concepts.

Discriminant validity requires lower correlations between constructs than their square root AVE values. The link between AI Personalization (AIP) and AI Problem Solving (AIPS) is moderately high (0.487). With a correlation of 0.628, AR Engagement (ARE) and AR Social Interaction (ARSI) are less related than their AVEs (0.910) and (0.861), demonstrating their distinctness. Finally, the table shows this study's notions are unique enough to meet the Fornell-Larcker discriminant validity requirement. This resilience of the measurement approach shows that the constructs can be treated independently without damaging the research's comprehensive picture of AI and AR's influence on education.

Table 3: Fornell Larcker

	AIP	AIPS	ARCE	ARE	ARSI	LOS
AIP	0.808					
AIPS	0.487	0.848				
ARCE	0.454	0.537	0.846			
ARE	0.394	0.554	0.405	0.910		
ARSI	0.470	0.593	0.456	0.628	0.861	
LOS	0.432	0.495	0.624	0.452	0.462	0.886

4.4 Construct Validity: Cross-Loadings Analysis

Table 4 shows that measurement item cross-loadings across constructs indicate the validity of this study's constructs. This analysis compares item loadings to constructions and others. Each item's construct validity is to load highest on its intended construct and lowest on others. The off-diagonal numbers reflect the loadings of items on other constructions, while the diagonal values represent their construct loadings. An item loads 0.901 on AIP1 and 0.444 on AIP, significantly higher than on other constructs, with the second highest on AIPS. AIP elements follow this pattern, which is aligned to their construct but is different.

As with AI Problem Solving (AIPS), they have high loadings on the targeted construct (e.g., AIPS3 has 0.921) and low loadings on other constructs, providing them a distinctive contribution to the measurement model. AR Engagement (ARE) and AR Social Interaction (ARSI) items also show clarity and validity, with loadings of 0.890 for ARE1 and 0.941 for ARSI1. However, Learning Outcomes (LOS) items like LOS2 have a high loading of 0.922, indicating a strong association with the construct and less cross-loading on other items, verifying its distinctiveness. Finally, this table illustrates that each item measures its intended construct and supports the study's construct validity.

Table 4: Cross-loadings

	AIP	AIPS	ARCE	ARE	ARSI	LOS
AIP1	**0.901**	0.444	0.359	0.351	0.413	0.365
AIP2	**0.854**	0.364	0.271	0.297	0.344	0.281
AIP3	**0.774**	0.318	0.361	0.298	0.293	0.384
AIP4	**0.685**	0.419	0.458	0.314	0.437	0.360
AIPS1	0.321	**0.784**	0.473	0.452	0.497	0.391
AIPS2	0.404	**0.834**	0.442	0.503	0.550	0.407
AIPS3	0.481	**0.921**	0.492	0.504	0.512	0.471
AIPS4	0.431	**0.849**	0.420	0.424	0.459	0.405
ARCE1	0.424	0.480	**0.837**	0.393	0.373	0.532
ARCE2	0.400	0.439	**0.852**	0.322	0.345	0.548
ARCE3	0.343	0.455	**0.860**	0.353	0.443	0.533
ARCE4	0.369	0.441	**0.836**	0.300	0.384	0.495
ARE1	0.339	0.528	0.391	**0.890**	0.576	0.426

ARE2	0.328	0.496	0.350	**0.934**	0.519	0.393
ARE3	0.405	0.526	0.398	**0.923**	0.576	0.448
ARE4	0.358	0.465	0.333	**0.893**	0.608	0.375
ARSI1	0.458	0.597	0.433	0.541	**0.941**	0.444
ARSI2	0.399	0.509	0.429	0.443	**0.859**	0.437
ARSI3	0.365	0.513	0.363	0.511	**0.912**	0.383
ARSI4	0.382	0.411	0.340	0.631	**0.716**	0.322
LOS1	0.362	0.450	0.546	0.354	0.384	**0.855**
LOS2	0.325	0.441	0.572	0.370	0.425	**0.922**
LOS3	0.366	0.396	0.501	0.459	0.401	**0.878**
LOS4	0.473	0.462	0.586	0.423	0.426	**0.888**

4.5 Analysis for Construct Validity: Heterotrait-Monotrait Ratio (HTMT)

Table 5 shows the Heterotrait-Monotrait Ratio (HTMT), and it indicates that higher HTMT values weaken discriminant validity, meaning constructs are similar. Off-diagonal numbers are the HTMT ratios between constructs, while diagonal values are correlations between items in the same construct and are not shown. The AI Personalization (AIP) to AI Problem Solving (AIPS) HTMT value is 0.564, indicating that these constructs are generally independent but moderately connected. AI Personalization (AIP), AR Creativity Enhancement (ARCE), and AR Engagement (ARE) have lower HTMT values of 0.534 and 0.447, respectively, indicating more substantial discriminant validity. The HTMT score between AR Engagement (ARE) and AR Social Interaction (ARSI) is 0.683, which is strong and may imply a conceptual overlap. This shows that various constructions may share a common element but offer unique insights worth investigating. The HTMT analysis in Table 5 reveals that most constructs have sufficient discriminant validity, indicating the study framework's robustness. These values must be maintained to ensure study construct dependability and research credibility.

Table 5: Heterotrait Monotrait ratio

	AIP	**AIPS**	**ARCE**	**ARE**	**ARSI**	**LOS**
AIP						
AIPS	0.564					
ARCE	0.534	0.620				
ARE	0.447	0.616	0.448			
ARSI	0.542	0.680	0.522	0.683		
LOS	0.500	0.554	0.700	0.492	0.517	

4.6 A Structural Equation Model

Figure 2 represents a structural equation modeling (SEM) analysis using Partial Least Squares (PLS) path modeling. The figure displays relationships between latent variables (represented by blue circles) and their corresponding observed indicators (denoted in yellow), along with the standardized factor loadings and path coefficients. In the figure, AIP (Artificial Intelligence Personalization) and ARE (Augmented Reality Engagement) are exogenous latent variables with their respective indicators (AIP1, AIP2, AIP3, AIP4, and ARE1, ARE2, ARE3, ARE4). The loadings indicate the strength of each observed variable's relationship with its latent construct. For instance, the indicator AIP1 has a loading of 0.901, indicating a strong relationship with the latent variable AIP.

The latent variable LOS (Learning Outcome Satisfaction) is connected to the indicators LOS1, LOS2, LOS3, and LOS4, with similarly strong factor loadings ranging from 0.855 to 0.922. The endogenous latent variables AIPS (AI-Personalization Satisfaction), ARCE (Augmented Reality Creativity Enhancement), and ARSI (Augmented Reality Social Interaction) are the outcomes of interest, connected to their respective indicators with high loadings as well. The figure shows the path coefficients between the latent variables. For example, the path from AIP to AIPS has a coefficient of 0.308, indicating a moderate positive relationship. Additionally, the path from ARE to ARSI has a higher coefficient of 0.534, suggesting a stronger relationship. The dashed lines between latent variables such as LOS and AIPS show there are also mediating effects in the model.

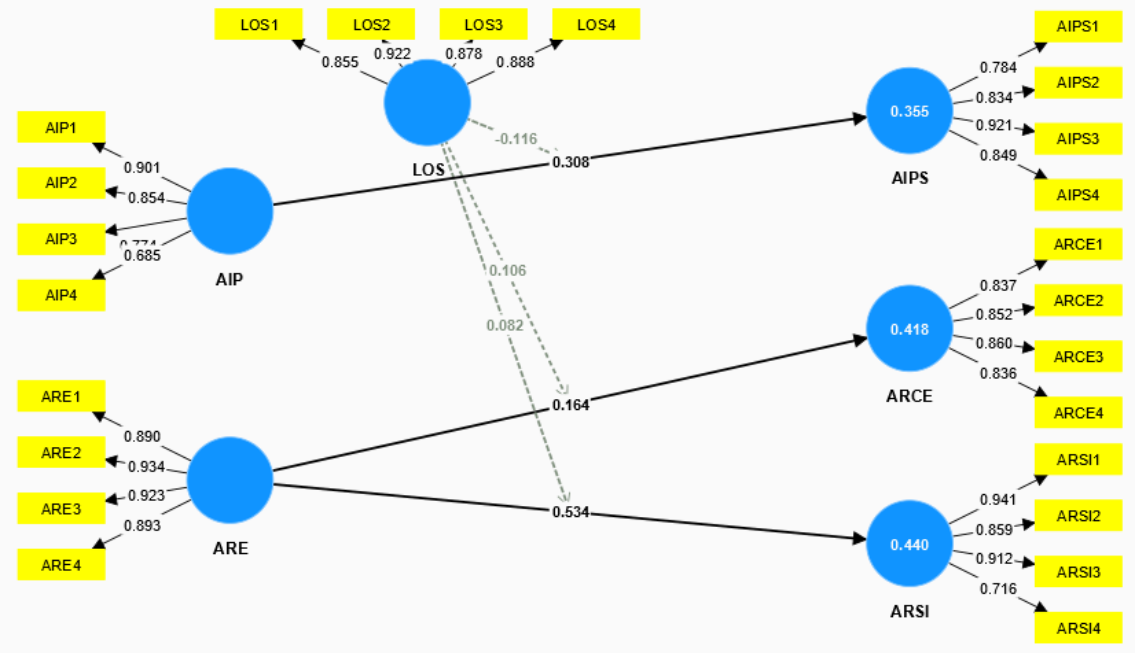

Figure 2: Structure Equation Model

4.7 Structural Relationships Among Constructs: Path Analysis Results

Table 6 shows the path analysis results for the study model's constructs, coefficients, standard deviations, t statistics, and P values.

The beta coefficients indicate the strength and direction of these routes, and the t statistics and P values demonstrate their significance. The analysis demonstrates a significant effect between AI Personalization (AIP) and AI Problem Solving (AIPS) with a Beta of 0.308, t statistic of 6.724, and p-value of 0.000. As with AR Engagement (ARE), AR Creativity Enhancement (ARCE) (Beta = 0.164, t = 3.432, P = 0.001) and AR Social Interaction (ARSI) (Beta = 0.534, t = 8.957, P = 0.000) are also significantly affected by AR Engagement, indicating that higher engagement increases creativity and social interaction. The Learning Outcomes (LOS) construct shows significant positive pathways to AIPS (Beta = 0.331, t = 7.273, P = 0.000) and ARCE (Beta = 0.559, t = 10.478, P = 0.000), demonstrating that more excellent learning outcomes promote problem-solving and creativity (Dodridge, 1999; Kinta, 2013). The results also confirm that the Learning Outcomes (LOS) significantly affect ARSI, meaning that LOS improve the ARSI level.

As LOS and AIP decrease AIPS (Beta = -0.116, t = 3.494, P = 0.000), learning outcomes may mitigate the effect of AI personalization on problem-solving. Engagement boosts the impact of learning outcomes on creativity (Beta = 0.106, t = 2.223, P = 0.026). However, the path from LOS x ARE to ARSI is marginally significant (Beta = 0.082, t = 1.720, P = 0.086), suggesting further research may be needed to validate the link. The route analysis reveals how these constructs interact and how learning results boost AI-driven engagement and creativity.

Table 6: Path analysis

Relationships	Beta	Standard deviation	t statistics	P values
AIP -> AIPS	0.308	0.046	6.724	0.000
ARE -> ARCE	0.164	0.048	3.432	0.001
ARE -> ARSI	0.534	0.060	8.957	0.000
LOS -> AIPS	0.331	0.046	7.273	0.000
LOS -> ARCE	0.559	0.053	10.478	0.000
LOS -> ARSI	0.227	0.058	3.907	0.000
LOS x AIP -> AIPS	-0.116	0.033	3.494	0.000
LOS x ARE -> ARCE	0.106	0.048	2.223	0.026
LOS x ARE -> ARSI	0.082	0.048	1.720	0.086

4.8 A Partial Least Squares Structural Equation Model

Figure 3 shows Partial Least Squares (PLS) Structural Equation Model examines latent variable-indicator relationships. Interpret construct relationships using variables, trajectories, regression coefficients, factor loadings, and p-values. AIP and ARE are exogenous latent variables measured by four indices. The indicators' loadings (AIP1 = 66.262, AIP2 = 26.543) show their high connection with latent constructs. These values illustrate how well each variable explains its construct. Learning outcome satisfaction (LOS) mediates LOS1, LOS2, LOS3, and LOS4. The indicators' high loadings (LOS2 = 103.581) imply they accurately measure learning outcome satisfaction.

AIP predicts learning outcomes and ARE utilizing endogenous latent variables AIPS, ARCE, and ARSI. From AIP to AIPS, the coefficient is 0.355, indicating a positive and significant effect (p-value = 0.000). ARCE and ARSI are highly influenced by ARE at 0.418 and 0.440. LOS mediates its connections with AIPS (0.106), ARCE (0.082), and ARSI (-0.116). Structural routes reveal LOS's indirect effects, even if some are small (p = 0.086 for LOS-ARSI).

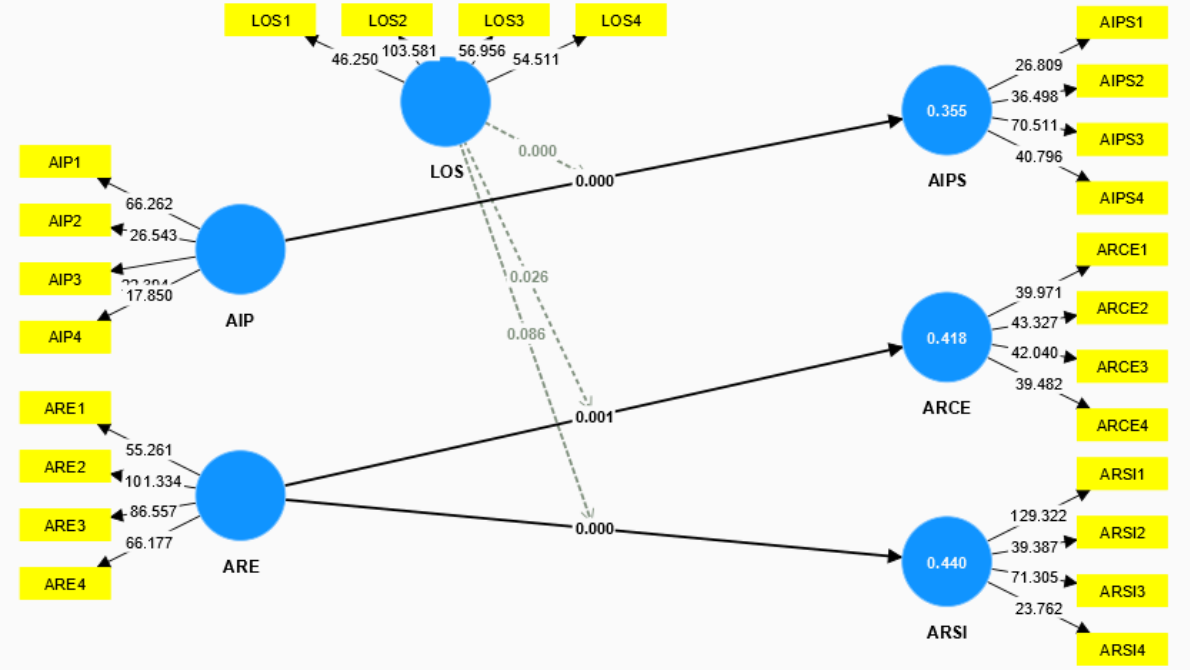

Figure 3: Structural assessment model

5. DISCUSSION

The findings of this study reveal several important insights into the relationships between AI Personalization, AI Problem-Solving, Augmented Reality (AR) Engagement, AR Creativity Enhancement, AR Social Interaction, and Learning Outcomes. The strong positive correlations among these constructs indicate that as the effectiveness of AI and AR increases, so do the learning outcomes, suggesting that well-implemented technologies can significantly enhance educational experiences. Results indicated a strong positive relationship between AI Personalization (AIP) and AI Problem Solving (AIPS). This suggests that personalized AI systems adapted to individual learning needs and preferences or improve learners' problem-solving ability. It aligns with the existing literature regarding the need for tailor-made educational interventions (Alexandre & Enslin, 2017; Chiyoun et al., 2024; Maghsudi et al., 2021; Myhre et al., 2020). This is done with the help of data analytics and AI, leveraging data analytics to adapt instructional methods and improve problem-solving skills (Papadopoulos & Hossain, 2023).

This study found that AR Engagement (ARE) has a strong positive effect on AR Creativity Enhancement (ARCE) and AR Social Interaction (ARSI). The power of AR technologies is then reiterated for creating immersive and interactive learning environments. Therefore, AR raises the affinity of creativity by providing a rich context in which to interact (Chandrasekera & Yoon, 2018; Persefoni & Tsinakos, 2015), consequently sparking social interactions among learners (Godoy Jr, 2021; Wannapiroon et al., 2021). AR provides honest life feedback and collaborative opportunities, which improve learning compared to conventional computer-aided learning, thus affirming that engagement plays a vital role in educational technology (Tlili et al., 2023; Weerasinghe et al., 2022). The effectiveness of both AI and AR interventions was influenced by a significant construct, Learning Outcomes (LOS). The results confirmed that LOS positively affects AIPS, ARCE, and ARSI, which implies that better learning outcomes boost problem-solving, creativity and social interactions and vice versa.

This finding underscores the robust relationship between educational technology effectiveness and learning outcomes (Kim & Shim, 2022; Salas-Pilco, 2020). With improved outcomes, learners become more interested in working with AI and AR tools, improving their educational experiences (Behera, 2023).

Interaction effects were investigated and found to moderate the relationships between AI Personalization and AI Problem-Solving and between AR Engagement and Creativity Enhancement. This indicates that the quality of learning outcomes can drive the effective use of these technologies in fostering problem-solving and creativity. This finding underlines the need for creating educational interventions focused on improving the use of technology and improving the assessment and promotion of learning outcomes (Ossiannilsson & Ioannides, 2017).

The results of this study have practical implications for educators and instructional designers. This research highlights the positive relationships that emerged as AI and AR technologies can be effectively integrated into educational settings. AI should be personalized and implemented in institutions as these types of AI enhance the learners' interactions (Papadopoulos & Hossain, 2023). Moreover, any learning application employing these technologies should include a formative evaluation of learning outcomes concerning the intended educational outcomes (Tlili et al., 2023).

Lastly, this work provides fresh perspectives on applying AI and AR technologies in learning environments. In general, there is a positive correlation between the constructs. Therefore, they demonstrate that meaningful and individualized learning can positively impact learning outcomes by enhancing problem-solving skills and creativity. Since there is a constant advancement in educational technology, it will be essential to educate as the technology advances to offer and develop dynamic learning environments that will produce successful students. Longitudinal studies should be the future of research that explores the impact of AI and AR technologies on learning outcomes in different learning environments.

6. CONCLUSION

This paper examines the relationship between AI Personalization, AI Problem Solving, AR engagement, creativity boost, and social interaction in influencing Learning Outcomes. This work implies that differentiated AI interactions and effective utilization of engagement time can boost the learners' problem-solving skills and creativity. All these positive correlations between these constructs imply that effective AI systems and AR environments can create meaningful learning and enhanced learning results. The study's findings reveal a relationship between the use of AI personalization and problem-solving ability, and therefore, AI interventions are required in a learning environment. Furthermore, the level of engagement in AR enhances innovative ability and communication skills, which means that integrating AR technologies in learning facilities will enhance learning as it becomes more collaborative. Analyzing the interaction effects, it has been found that Learning Outcomes are active in changing other constructs and moderating the relationships between them, thus pointing out the complexity of the interactions. Understanding the moderating role of Learning Outcomes, educators and instructional designers can evaluate the potential of leveraging AI and AR technologies with well-designed strategies to increase learning effectiveness. The study provides critical points for designing and utilizing AI and AR in education, with significant implications for educationists, policymakers, and technology developers.

This should be followed up by future research to explore these relationships further in different educational contexts and populations to understand better how these technologies can be used to get the best learning out of them.

7. POLICY SUGGESTIONS AND PRACTICAL IMPLICATIONS

Several policy suggestions could be made to improve the integration of AI and AR technologies in education. The second central area for investment lies in creating individualized AI systems that learn and adapt to each student's learning needs so that they can tailor the problem-solving experience. Second, schools and universities should promote AR technologies to enrich creativity and social interaction among students and provide them with more immersive learning environments. Furthermore, intense focus on regular evaluation and course correction of the learning outcomes are expected to be exercised till these technologies accomplish the planned educational outcomes. Finally, government and educational policymakers should spend dollars to fund teacher training in AI for educators so they can effectively implement these superior technologies in the classroom. The outcome of these initiatives will create an engaging student success environment. The study offers insights into users' needs and challenges in interacting with new technology, aiding developers to create user-friendly, easily implementable, and educationally effective AI and assistive technologies tailored for young children.

9. STUDY'S LIMITATIONS

The sample was limited to educators who reported prior use of AI or AR in their teaching practices, potentially rendering it unrepresentative of the broader population of preschool educators, particularly those with minimal or no experience with these technologies. Secondly, data collection occurred online, resulting in a sample that consisted solely of educators who utilize the internet and are proficient with online tools, thereby introducing potential bias in the sample. Third, this research utilized self-reported data, which may lead participants to offer their own or perceived stereotype responses.

Acknowledgments: The author thanks the anonymous reviewers for their comments on the manuscript.
Fundings: The study was supported by the Sichuan Research Center of Higher Vocational Education—Key Research Bases of Humanities and Social Sciences in Higher Educational Institutions of Sichuan Province, initiated project: Research on Innovative Application Path of Artificial Intelligence + AR in Ideological and Political Education of Higher Vocational Preschool Education Curriculum, project approval number: GZY24B28.
Author contributions: The author solely contributes to this study.
Ethical Statement: The study procedures were approved by the Faculty of Educational Studies, Urban Vocational College of Sichuan, Chengdu, China. In this case, the study proposal was subjected to the

University Ethical Committee to ensure that all the procedures followed were ethical and met the University's Ethical Standards.

Consent to Participate: Approved

Competing Interests: The author declares that this work has no competing interests.

Data Availability Statement: The associated data is available upon request from the corresponding author.

Declaration Statement of Generative AI: This study's author(s) declared that no AI content has been used in the paper preparation.

REFERENCES

Alexandre, J., & Enslin, C. (2017). The relationship between personalized instruction, academic achievement, knowledge application, and problem-solving skills. *National Teacher Education Journal, 10*(1).

Askarova, S., Madiyeva, G., Mirqosimova, M., Boqiyeva, R., Nazarov, A., & Baratova, D. (2024). A well-designed, personalized, and optimized model implementation for a specific education system. Paper presented at the *2024 4th International Conference on Advance Computing and Innovative Technologies in Engineering (ICACITE)*. 10.1109/ICACITE60783.2024.10617032.

Avila-Garzon, C., Bacca-Acosta, J., Duarte, J., & Betancourt, J. (2021). Augmented reality in education: An overview of twenty-five years of research. *Contemporary Educational Technology, 13*(3).

Behera, D. K. (2023). Technological interventions in education: An empirical review of their impact on learning outcomes. *ALSYSTECH Journal of Education Technology, 1*(1), 62–77.

Chandrasekera, T., & Yoon, S.-Y. (2018). The effect of augmented and virtual reality interfaces in the creative design process. *International Journal of Virtual and Augmented Reality, 2*(1), 1–13. https://doi.org/10.4018/ijvar.2018010101

Chen, L., Chen, P., & Lin, Z. (2020). Artificial intelligence in education: A review. *IEEE Access, 8,* 75264–75278.

Chiyoun, P., Jaedeok, K., Sohn, Y., & Inkwon, C. (2024). *Method and apparatus for artificial intelligence model personalization* (U.S. Patent No. 11,961,013). https://patents.google.com/patent/WO2021010651A1

Dodridge, M. (1999). Learning outcomes and their assessment in higher education. *Engineering Science & Education Journal, 8*(4), 161–168. https://doi.org/10.1049/esej:19990405

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*(1), 39–50.

Godoy Jr, C. H. (2021). *Augmented reality for education: A review*. arXiv preprint arXiv. https://doi.org/10.48550/arXiv.2109.02386

Iqbal, M. Z., Mangina, E., & Campbell, A. G. (2022). Current challenges and future research directions in augmented reality for education. *Multimodal Technologies and Interaction, 6*(9), 75.

Kaswan, K. S., Dhatterwal, J. S., & Ojha, R. P. (2024). AI in personalized learning. In *Advances in technological innovations in higher education* (1st ed.). CRC Press. https://doi.org/10.4324/9781003376699

Katiyar, N., Awasthi, M. V. K., Pratap, R., Mishra, M. K., Shukla, M. N., & Tiwari, M. (2024). AI-driven personalized learning systems: Enhancing educational effectiveness. *Educational Administration: Theory and Practice, 30*(5), 11514–11524.

Khan, T., Johnston, K., & Ophoff, J. (2019). The impact of an augmented reality application on learning motivation of students. *Advances in Human-Computer Interaction, 2019*(1), 7208494.

Kim, J., & Shim, J. (2022). Development of an AR-based AI education app for non-majors. *IEEE Access, 10,* 14149–14156. https://doi.org/10.1109/access.2022.3145355

Kinta, G. (2013). Theoretical background for learning outcomes-based approach to vocational education. *International Journal for Cross-Disciplinary Subjects in Education, 3*(3), 1533–1541. https://doi.org/10.20533/ijcdse.2042.6364.2013.0215

Kuchkarova, G., Kholmatov, S., Tishabaeva, I., Khamdamova, O., Husaynova, M., & Ibragimov, N. (2024). AI-integrated system design for early-stage learning and erudition to develop analytical Deftones. Paper presented at the *2024 4th International Conference on Advance Computing and Innovative Technologies in Engineering (ICACITE)* (pp. 795-799). IEEE.

Luckin, R., Cukurova, M., Kent, C., & du Boulay, B. (2022). Empowering educators to be AI-ready. *Computers and Education: Artificial Intelligence, 3.* https://doi.org/10.1016/j.caeai.2022.100076

Luiz, J., da Rocha Neto, M. I. A., Costa, I. A., Saez Bragança Barros, F. R. G., Batista, G. P. M. (2023). Prolonged use of screens in children and their harm. *Global Journal of Medical Research, 23* (K6). https://doi.org/10.34257/gjmrkvol23is6pg49

Madžar Čančar, A., Vuković, S., Živanović, B., Mastilo, S., Bakoč, A., & Zečević, I. (2024). Screen time in preschool-aged children. *Multidisciplinarni Pristupi u Edukaciji i Rehabilitaciji, 6*(7), 57–65. https://doi.org/10.59519/mper6106

Maghsudi, S., Lan, A., Xu, J., & van der Schaar, M. (2021). Personalized education in the artificial intelligence era: What to expect next. *IEEE Signal Processing Magazine, 38*(3), 37–50. https://doi.org/10.1109/msp.2021.3055032

Merín, L., Toledano-González, A., Fernández-Aguilar, L., Nieto, M., Del Olmo, N., & Latorre, J. M. (2024). Evaluation of the association between excessive screen use, sleep patterns, and behavioural and cognitive aspects in preschool population: A systematic review. *European Child & Adolescent Psychiatry, 23 (*12)., 4097-4114.

Myhre, N. M., Kulkarni, A. P., Joshi, Y. M., Sachidanandam, V., & Gates III, W. H. (2020). *Personalized artificial intelligence and natural language models based upon user-defined semantic context and activities* (U.S. Patent Application 16/020,946).

Ossiannilsson, E., & Ioannides, N. (2017). Towards a framework and learning methodology for innovative mobile learning: A theoretical approach. Paper presented at the *Proceedings of the 16th World Conference on Mobile and Contextual Learning*. (pp. 1-8).

Papadopoulos, D., & Hossain, M. M. (2023). Education in the age of analytics: Maximizing student success through big data-driven personalized learning. *Emerging Trends in Machine Intelligence and Big Data, 15*(9), 20–36.

Persefoni, K., & Tsinakos, A. (2015, September). Use of Augmented Reality in terms of creativity in School learning. In *Workshop of making as a pathway to foster joyful engagement and creativity in learning (Make2Learn)* (Vol. 45).

Salas-Pilco, S. Z. (2020). The impact of AI and robotics on physical, social-emotional, and intellectual learning outcomes: An integrated analytical framework. *British Journal of Educational Technology, 51*(5), 1808–1825. https://doi.org/10.1111/bjet.12984

Tlili, A., Padilla-Zea, N., Garzón, J., Wang, Y., Kinshuk, K., & Burgos, D. (2023). The changing landscape of mobile learning pedagogy: A systematic literature review. *Interactive Learning Environments, 31*(10), 6462–6479.

Wannapiroon, P., Nilsook, P., Kaewrattanapat, N., Wannapiroon, N., & Supa, W. (2021). Augmented reality interactive learning model using the imagining process for the SMART classroom. *TEM Journal, 10*(3), 1404–1417. https://doi.org/10.18421/tem103-51

Weerasinghe, M., Quigley, A., Pucihar, K. Č., Toniolo, A., Miguel, A., & Kljun, M. (2022). Arigatō: Effects of adaptive guidance on engagement and performance in augmented reality learning environments. *IEEE Transactions on Visualization and Computer Graphics, 28*(11), 3737–3747.

Yılmaz, Ö. (2024). Personalized learning and artificial intelligence in science education: Current state and future perspectives. *Educational Technology Quarterly, 2024*(3), 255–274

Publisher's Note: All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations or the publisher, the editors and the reviewers. Any product that may be evaluated in this article or claimed by its manufacturer is not guaranteed or endorsed by the publisher.