

Smartphone Potential and Evolution of Class Culture in Universities

Haige Shi^{1,a}, Lan Zhou^{2,b}

shihaige@sina.com^a, zhoulan@bpi.edu.cn^b

School of Fundamental Education, Beijing Polytechnic, China¹
Department of Science and Technology, Beijing Polytechnic, China²

Abstract. The ubiquity of smartphones as a technological standard among university students in the 21st century has rendered mobile learning a commonplace phenomenon. The potential of smartphones has catalyzed a novel landscape in the educational domain. The widespread implementation of mobile learning in schools and the extensive application of smartphones in class management have intensified the cultural evolution of university class culture. This evolution is characterized by a shift from static to dynamic expression, from monolithic collective activities to multi-point dispersion, from dependency on small groups to independent rationality, from hierarchical to flat organizational structures, and from individual prominence to holistic optimization. While the application of smartphones has weakened traditional class culture, it has simultaneously accelerated the digital transition of class culture in the digital era. This has prompted class managers to leverage the potential of smartphones to implement more scientific and efficient management strategies to meet the modern governance demands of the digital age.

Keywords: Smartphone Potential, Class Culture, Organizational Relationship, Cultural Evolution

1 Introduction

According to the 52nd Statistical Report on the Development of the Internet in China released by the China Internet Network Information Center, as of June 2023, the scale of Chinese netizens reached 1.079 billion. The Chinese market boasts over 950 million smartphone users. The number of mobile netizens in China has surpassed that of traditional PC netizens, with a smartphone possession rate among university students reaching 100%, laying a solid foundation for the establishment of mobile learning models.

1.1 Smartphone potential

The application of smartphones in the educational field is an unstoppable trend. As the 21st century has unfolded, smartphones have become an indispensable tool for the youth, serving as highly integrated mobile communication devices with multifunctionality, portability, efficient information processing, and social networking capabilities. Smartphones integrate a variety of functions such as telephony, messaging, photography, recording, internet access, navigation, and entertainment, meeting the diverse daily and professional needs of users. Their compact size allows for use anytime, anywhere. Advanced smart operating systems like iOS

and Android enable multitasking and support a rich ecosystem of applications, allowing users to download and utilize a vast array of apps (Apps) across life, work, learning, and entertainment. Smartphones provide rapid internet access for acquiring and processing vast amounts of information, offering users instant news, data, and knowledge. Moreover, smartphones support various social networking applications, such as WeChat, facilitating user connectivity and communication. These advantages of smartphones are collectively termed as smartphone potential. Educators in the smartphone era must harness this potential to study its impact on various educational stakeholders, transforming smartphones into tools for enhancing educational management quality and efficiency, and achieving a digital leap in teachers' information literacy.

1.2 Manifestation of smartphone potential in university class management

The application of smartphones in the field of education has become a focal point of interest for numerous educational researchers. Current research, as documented in academic literature, predominantly focuses on three principal domains: the initial area pertains to the utilization of smartphones in subject-specific teaching, such as their integration into English, mathematics, and vocational courses. In the realm of English language instruction, scholars have explored the nuanced applications of mobile apps in vocational English listening and speaking pedagogy, encompassing pre-class preparation, in-class exercises, and post-class extension activities (Fu Ruiyang & Huang Na, 2021) [1]; the enhancement of vocabulary teaching through mobile learning based on WeChat, websites, and offline dictionary usage has been examined (Sun Jun, 2020) [2]; and research has been conducted on the application of mobile QR code technology in hotel English teaching (Wang Meng & Wang Hua, 2019) [3]. Additionally, strategies for making English classes engaging, informative, and effective through the use of WeChat groups to create mobile English corners, smartphone-based quizzes and private notifications, real-time emoji feedback, the establishment of a mobile micro-lesson teaching resource library, and a mobile teaching question bank have been proposed (Hu Yongping, 2019) [4]. In the context of higher education mathematics teaching, the judicious use of intelligent mobile devices can optimize teaching content, improve pedagogical methods, and facilitate personalized instruction, leveraging micro-videos and online assignments to enhance autonomous learning and classroom engagement [5]. The organic integration of online educational technology with traditional mathematical materials has been advocated, with the suggestion to incorporate QR codes on every page of textbooks for mobile learning [6]. In specialized courses such as biology, smartphones demonstrate applicational advantages in constructing online learning platforms, aiding classroom instruction, and conducting in-class assessments [7]. For hands-on oriented majors like automotive repair, educators can utilize live broadcasting features on mobile learning apps like DingTalk to demonstrate procedures on specific parts, thereby enriching the content of classroom teaching (Guan Jinhua, 2020) [8]. Furthermore, Chen Chengxian and Xiao Zonglin have explored the application of smartphone apps like Lanmo Cloud Classroom, Stereo Book City, and Chaoxing Learning Pass in automotive professional teaching [9].

The second domain involves the application of smartphones in educational management and class construction. Current practices of class management utilizing mobile media by homeroom teachers lack organizational goals, and there exists a problem of one-sidedness and superficiality in the use of mobile media for class management, without forming an

educational synergy for managing students' use of mobile media. The management and guidance of students' use of smartphones and other new media tools are inadequate [10]. There is a need to strengthen mobile media literacy training, conduct education and guidance on the correct and rational use of mobile media by students, and foster good habits in the use of mobile media [11]. Utilizing self-media platforms can flatten the management of class student work and open up new channels for class management using self-media as a vehicle [12].

The third domain discusses the negative impacts of smartphone use on educational teaching and learning. From "internet addiction" to "smartphone dependency," the internet and smartphones have brought about numerous adverse effects [13]. Smartphone dependency can significantly affect college students' sleep and mental health, and both students and educational workers should adopt various measures to overcome dependency and develop good habits for smartphone use [14]. Despite these negative impacts, the educational application of smartphones is widely recognized for its potential to "guide rather than block," promoting more scientific and efficient management methods.

Overall, the role of smartphone potential in university class management has become increasingly evident, encompassing five key roles: as a campus information disseminator, a provider of learning resources, a facilitator of interactive communication, a solver of personalized issues, and an enabler of convenient campus life. These roles have made the educational process more flexible and convenient, enhancing the quality and efficiency of services for university students and fostering interactivity and personalization among educational stakeholders. The advantages of smartphones have rendered them an indispensable tool in modern class management, contributing to improved management efficiency, teaching quality, and the holistic development of students.

2 Class culture in universities

2.1 Definition of class culture

Class culture refers to the shared values, beliefs, behavioral norms, and traditions that emerge within a class, serving as the spiritual pillar and source of cohesion for the group. It is characterized by common beliefs and values, behavioral norms and traditional practices, and a spirit of teamwork and mutual assistance. Class culture can be divided into soft culture, encompassing spiritual and behavioral aspects, and hard culture, which includes material and institutional aspects. Spiritual culture, as the intangible core of class culture, represents its highest form, including core themes, ideals, and value orientations, such as patriotism, integrity, a positive class ethos, and a diligent academic spirit. Material culture, the tangible aspect, involves the decoration of class bulletin boards, blackboards, activity corners, and the environment inside and outside the classroom.

The construction of class culture is a crucial component of a homeroom teacher's work and plays a pivotal role in the positive development of the class collective. The characteristics of class culture are reflected in the cohesion of the class, the learning atmosphere, teacher-student relationships, and students' behavioral habits, profoundly influencing their learning and growth.

2.2 Class culture: Characteristics and issues

Class culture is an indispensable part of university campus culture, significantly impacting the growth, development, and holistic progress of college students. The quality of class culture construction is of utmost importance for student development. Traditional class culture emphasizes respect and inheritance, valuing ceremonies and activities to enhance class cohesion and cultural identity. It fosters a collective spirit, social responsibility, adherence to rules and respect for teachers, and emphasizes moral education and academic pursuit, emphasizing the cultivation of values such as integrity, respect, and responsibility, and encouraging academic excellence, diligent study, honest examination, and respect for knowledge.

2.3 Research progress and origins of the study

Scholarly research on class culture can be summarized into the "three-level theory," "four-in-one theory," "diversity theory," and "democratic participation theory." The "three-level theory" by Chang Yahui [15] views class culture as a latent force in class construction with constraining and edifying educational functions. It proposes a class construction approach focusing on reconstruct the group ambiance clarifying group structure, and internalizing group norms to enhance the institutional environment of class culture. Wang Cheng and Liao Qiyun [16] address issues such as the lack of intrinsic motivation, external system support, and counselor understanding, suggesting a class-centered approach to the material, institutional, and spiritual aspects of class culture construction. Bai Shi and Jing Yang [17] innovatively propose a "four-in-one" model for the construction of material, spiritual, institutional, and activity cultures in university classes. The "diversity theory" by Lu Hailan [18] advocates for differentiated management mechanisms and innovative strategies, respecting individual differences and fostering independent thinking and innovative capabilities. Zhang Liqiang [19] studies class culture from the perspective of public governance, advocating for a shift in the teacher's role from micromanagement to macromanagement to build a democratic participatory class culture. These studies, though diverse in expression, essentially elucidate class culture construction from perspectives such as educational function, construction model, operational mechanisms, and public governance, forming the framework of traditional class culture construction.

In the digital age of widespread smartphone use, traditional class culture is continuously absorbing new elements to adapt to the needs of modern society. What new changes and characteristics have emerged in the new era of class culture? What role does the potential of smartphones play in shaping this new class culture? These questions form the research hypotheses and inquiries of this paper.

3 New class culture in universities

In the digital era, scholars (Zhang Jianbo, 2015) have proposed the effective utilization of new media for class culture construction, advocating for the nurturing of brand activities, the use of unified platform media tools, the emphasis on online moral education, and the strengthening of online public opinion guidance as effective pathways. Others have suggested the construction of both primary and subculture systems within the class (Mohammad Aliakbari &

Rahil Darabi, 2013), recognizing the class as a quasi-social organization that exhibits different levels of internal culture and functionality. [20] This includes the primary culture represented by class organizational culture, class institutional culture, and class material culture, as well as subculture systems. It is necessary to consider these different levels in class culture construction; while reinforcing the primary class culture, attention should also be paid to the establishment and guidance of the class's subculture system.

In the smartphone era, the integration of information technology has become a salient feature of the new class culture. The use of smartphones has made class management, communication, and learning activities more convenient and efficient. For instance, class teachers and students engage in instant communication and information sharing through mobile applications and social media, updating class dynamics in real-time on online platforms, and sharing learning outcomes, event photos, and teacher messages. Most information is now directly disseminated in class WeChat groups, reducing intermediary steps and enhancing class work efficiency. The proliferation of smartphones has diversified class management methods. For example, class teachers use mobile applications for student attendance, grade management, and home-school communication, thereby improving management efficiency. Class activities have become more varied, both online and offline, and are more dispersed and personalized in terms of time and space. Previously, there was a greater reliance on small class groups, with emotional concerns about group isolation. Now, there is a greater respect for individual space, an emphasis on democracy and equality, and an enhancement of self-management capabilities, leading to a more independent and rational mindset.

Regarding the actual situation of class culture construction before and after the use of smartphones, the author conducted a questionnaire survey on class culture construction before and after smartphones usage. The surveyed students were from four professional classes (23 Inspection and Quarantine Class, 23 Automobile Maintenance Class, 23 Rail Transit Class, and 23 Computer Class) at a university in Beijing. A total of 192 questionnaires were distributed, and 179 were returned. The results are shown in Table 1. The questionnaire divided class culture construction into four dimensions: presentation state, activity form, emotional relationships, and organizational relationships. According to the survey results, in the four dimensions of class culture construction, 98% of the students strongly agreed that "most information is now directly notified in the class WeChat group after using smartphones, reducing intermediate steps and improving class work efficiency." Among the 179 respondents, 174 (97%) strongly agreed that "there is now greater respect for individual space, with an

Table 1 Survey Results on Changes in Class Culture Before and After the Use of Smartphones.

No.	Class Culture Construction Dimension	Specific Question	Strongly Agree (A)	Agree (B)	Not Sure (C)
1	Presentation State (Dynamic/ Static)	Previously, mainly bulletin boards, slogans, and honor rolls in the classroom.	158 88%	20 11%	1 1%
2		Now mainly through online platforms for real-time updates on class dynamics, sharing learning outcomes, activity photos, teacher messages, etc.	171 96%	6 3%	2 1%

3	Activity Form (Unified/ Diverse)	Previously, activities were relatively uniform, often collective and unified, such as sports meets, cultural performances, etc.	145 81%	33 18%	1 1%
4		Now activities are rich and diverse, more dispersed and personalized in time and space, both online and offline.	168 94%	9 5%	2 1%
5	Emotional Relationships (Group Dependence/ Independent Rationality)	Previously, more dependent on small group dynamics, emotionally concerned about being isolated from the group.	152 85%	26 15%	1 1%
6		Now there is greater respect for individual space, emphasis on democracy and equality, and an increase in self-management capabilities, becoming more independent and rational.	174 97%	3 2%	2 1%
7	Organizational Relationships (Hierarchical /Flat)	Previously, information such as activity notifications was mainly conveyed by the homeroom teacher or counselor to the class leaders, then to ordinary students.	169 94%	8 4%	2 1%
8		Now most information is directly notified in the class WeChat group, reducing intermediate steps and improving class work efficiency.	175 98%	3 2%	1 1%

emphasis on democracy and equality, and an enhancement of self-management capabilities, leading to a more independent and rational mindset." 94% of the students strongly agreed that "the current form of activities is rich and diverse, both online and offline, and more dispersed and personalized in terms of time and space." In terms of presentation state, 171 (96%) strongly agreed that "class dynamics are now mainly updated in real-time through online platforms, sharing learning outcomes, event photos, and teacher messages," while 88% believed that "previously, the main presentation was through bulletin boards, slogans, and honor boards in the classroom."

4 Class culture transformation

The survey indicates that following the adoption of smartphones, class culture has undergone a transformation from static display to dynamic communication. Class activities have shifted from singular collective events to multi-point dispersion. Class emotional relationships have evolved from small-group dependency to independent rationality. Class organizational structures have transitioned from hierarchical to flat, and the outcomes of class construction have shifted from highlighting individual achievements to overall optimization.

4.1 From static display to dynamic communication

Prior to the smartphone era, class culture was often static, such as bulletin boards, slogans, and honor rolls in classrooms. These elements, while reflecting the class's spirit and values, were

typically fixed and lacked interactivity and timeliness. With the proliferation of smartphones and social media, class culture has shifted towards dynamic communication. Now, classes can create online platforms or social media accounts to update class dynamics in real-time, sharing students' learning outcomes, event photos, and teacher messages. This dynamic mode of communication not only reflects the class's latest situation promptly but also enhances interaction among students, parents, and teachers, making class culture more vibrant and engaging. Additionally, through online polls and surveys, class culture can better reflect students' opinions and needs, making cultural construction more democratic and personalized.

For instance, a university has implemented dynamic class culture communication through the establishment of a class WeChat public account. This account regularly publishes class news, academic lectures, student work showcases, diverse class stories, and class activity albums. It also collects students' opinions on class activities through online polls and surveys. In a survey on class culture construction, 95% of students reported that they could promptly understand class dynamics through the public account, and 87% felt that this interactive approach strengthened their sense of identification with the class culture. Moreover, the public account uses data analysis to track reading volume and interaction frequency, helping the homeroom teacher optimize content strategies for more precise and effective class culture communication.

4.2 From singular collective to multi-point dispersion

Traditionally, class activities were often collective, such as sports meets and cultural performances that the entire class participated in. While these activities could enhance class cohesion, they might not meet all students' interests and needs. The advent of the smartphone era has led to a diversification and dispersion of class activity formats. Students can now choose to participate in different activities based on their interests and schedules. For example, some students might prefer online programming competitions, while others might be more interested in joining animal protection associations. With smartphones, students can select activities according to their schedules, enriching class culture. This multi-point, dispersed activity format not only stimulates student participation but also promotes their development and growth in various fields.[21] For instance, a university's computer science department has implemented a "personalized learning path" project, allowing students to choose different courses and activities based on their interests and career plans. For students interested in artificial intelligence, the department offers AI workshops, online MOOC courses, and project practice opportunities in collaboration with enterprises. According to the project evaluation report, 72% of students participating in the personalized learning path reported significant improvements in their professional skills, and 90% felt that this dispersed activity format better met their personalized needs.

4.3 From small-group dependency to independent rationality

Before the smartphone era, class emotional relationships were often close-knit, with strong interaction and dependency among students. However, with the widespread use of smartphones, students have gained more personal space and independence. They can maintain contact with the outside world through their phones, reducing their reliance on small class groups. This change has gradually shifted class emotional relationships from traditional small-group dependency to independent rationality. Students have learned to think and solve problems more independently within the class while also learning to establish healthy social

relationships while maintaining their individuality. [22] This transformation helps cultivate students' self-management and social skills, laying a solid foundation for their future social life. For example, a comprehensive university's psychology department has facilitated the shift to independent rational emotional relationships by introducing online psychological counseling services and emotional management courses. According to department statistics, the number of students using online psychological counseling services increased by 45% over the past year, and student satisfaction with emotional management courses reached 92%. These services and courses have helped students learn to establish healthy interpersonal relationships while maintaining their individuality.

4.4 From hierarchical to flat organizational structures

Traditional class organizational structures are typically hierarchical, with the homeroom teacher at the top and students organized in a certain hierarchical structure. This structure ensures class order and management efficiency to some extent but may also lead to delayed information transmission and reduced student participation. [23] In the smartphone era, class organizational relationships have begun to shift from a vertical tree-shaped structure towards a flat frisbee-shaped structure as shown in Fig. 1. In this structure, the relationship between the homeroom teacher and students is more equal, and information transmission is faster and more direct. Students can more easily express their ideas and suggestions and participate in class

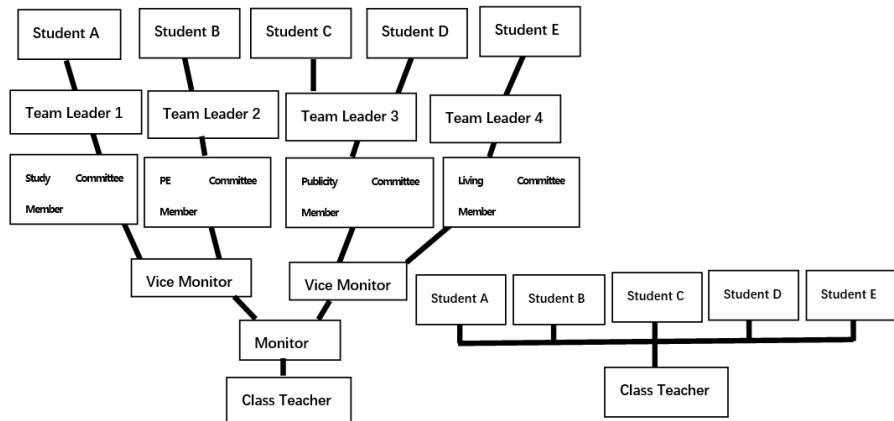


Fig.1 A Shift from Vertical Tree-shaped Structure towards a Flat Frisbee-shaped Structure.

decision-making. This flattened organizational relationship helps increase class flexibility and innovation and better stimulates students' initiative and creativity. For example, an engineering college has adopted a "Student Autonomous Committee" model to manage class affairs in a flattened manner. Under this model, the Student Autonomous Committee is elected by class members and is responsible for organizing class activities, coordinating resources, and conveying student opinions. According to the college's annual report, after implementing the Student Autonomous Committee, class activity participation rates increased by 30%, and student satisfaction with class management improved by 25%. This flattened organizational relationship has enhanced student participation and class management transparency.

4.5 From highlighting individuals to overall optimization

Historically, the efficacy of class development was predominantly gauged by the singular accomplishments of students, including academic grades and athletic contests. Such a focus on individual triumphs could engender a climate of intense rivalry, potentially overshadowing the collective well-being and advancement of the class ensemble. In an era defined by smartphone ubiquity, the metrics of class construction efficacy have evolved, transitioning from a spotlight on individual accolades to a paradigm of comprehensive optimization. Contemporary class culture is increasingly oriented towards the nurturing of collaborative ethos and a communal sense of pride, incentivizing students to engage actively in group endeavors and strive collectively towards shared objectives. This reorientation fosters a more congenial and nourishing educational ambience, wherein each student is empowered to identify their niche, actualize their personal potential, and make meaningful contributions to the class's holistic progression. For instance, an educational institution within a teachers' college of a normal university has instituted a "Teamwork and Leadership Enhancement" initiative, dedicated to bolstering the class's collaborative competencies and leadership acumen. The initiative facilitates student participation in teams through a spectrum of activities, including team-building exercises, leadership workshops, and hands-on project experiences. Project assessments reveal a marked improvement in team collaboration performance by 40% and a significant uptick of 35% in the class's leadership proficiency. These findings underscore a paradigmatic shift in the efficacy of class construction, highlighting a transition from a preoccupation with individual successes to the augmentation of collective competencies.

5 Conclusion and reflection

The proliferation of smartphones has catalyzed the digital metamorphosis of class culture within the contemporary information age. This technological shift has necessitated that class managers capitalize on the potential of smartphones to enact more methodical and efficacious management tactics, aligning with the imperatives of class organizational governance in the digital milieu. Despite the potential for incomplete survey findings due to the study's limited sample size, it is evident that the application of smartphones can augment the efficacy of class communication, bolster the construction of class culture, fortify emotional bonds among class members, and refine the organizational structure and administrative procedures. Nevertheless, the advent of smartphones in class management introduces novel challenges that require vigilant attention to mitigate potential detrimental effects. The expedited pace of information dissemination necessitates scrupulous precision in the conveyance of notifications. It is imperative to reinforce self-discipline education to circumvent distractions precipitated by smartphone usage, thereby enhancing academic concentration. Moreover, amidst the prevalence of online interactions, there is a compelling need to orchestrate a greater frequency of offline, direct interpersonal engagements to sustain a balanced approach to class management.

In the digital epoch, smartphones have revolutionized class management, presenting novel opportunities for educational stewards. Class managers must adeptly exploit the technological capabilities of smartphones to implement sophisticated management strategies, thereby enhancing class organizational management and fostering the evolution of class culture. This

integration of technology with pedagogy is essential for upholding traditional educational values while embracing modern innovation. The strategic use of smartphones in class administration is pivotal for nurturing academic excellence and promoting the comprehensive development of students. It is a critical tool for preparing learners to thrive in the 21st-century knowledge economy, making the judicious adoption of smartphone technology in educational management an integral aspect of progressive educational practices.

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