

A Study of Chinese Danmaku Video Sites for Self-directed Learning(CDSDL) from an Educational Perspective: A Case Study of Bilibili Website

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Abstract:With the advent of the information age, a video-oriented interactive method (Danmaku/Bouncer) has become popular. Due to the unique function and outstanding performance of "Danmaku" in the network, it has been rapidly adopted by several major domestic mainstream media (Bilibili, Youku, Tencent, etc.). Based on relevant educational theories and using the Bilibili website as a representative case, this study analyses in detail the motivation of students' participation in Danmaku through Danmaku on the Bilibili website through the use of research methods such as comprehensive analysis, literature reading. The study concludes that students engage in self-directed learning through Danmaku and make full use of them in order to eliminate the sense of isolation and distance brought by online learning. The article aims to analyse the relevant theories and behaviours to provide an in-depth analysis and understanding of the factors used by students to enhance the satisfaction of self-directed learning.

Keywords: Chinese danmaku video sites; self-directed learning; influencing factors; education

1 Introduction

In the twenty-first century, all colleges and universities have fully utilized modern information technologies, including computer and multimedia network technologies. The teaching model emphasizes student centrality in the educational process and teacher leadership in instruction parts (Alam, et al., 2021). In order to fully mobilize students' excitement for active learning and ability to foster students' capacity for knowledge creation and comprehensive knowledge usage, the majority of knowledge learning teachers should fully mobilize network technology with individualizing and empower teaching and learning (Chirag, Rathod, & Durgesh, 2021). "The future illiterate will not be those who cannot read, but those who have not learned how to learn autonomously" (Alvin Toffler. 1996). Learning venues and materials can be changed to suit individual needs and time constraints for gaining material and procedural knowledge. In short, self-directed learning addresses the needs of college students at various phases of study for knowledge acquisition and the development, and helps them adapt to future employment and enhanced liquidity (Bergamin, Bosch, Du Toit, Goede, Golightly, Johnson & van Zyl, 2019).

2 The concept of self-directed learning

In this study, the concept of Chinese Danmaku video sites for self-directed learning (CDSDL) can be exemplified by Bilibili. CDSDL emphasizes the learner's motivation and desire to study, assuming that individuals possess autonomy driven by factors like age, experience, and intrinsic learning needs. Autonomy is closely connected to self-directed learning (SDL), and understanding this connection helps identify factors that facilitate or hinder individuals' efforts in this domain. Bilibili, as an example of CDSDL, offers the Danmaku video comment function where users can overlay comments onto videos, with the comments flowing from right to left across the screen. Despite the unconventional viewing orientation in China, where the language is read from left to right, viewers find no difficulty in following the Danmaku comments. Internet learning environments on Danmaku video sites have gained popularity among Chinese university students, and Bilibili serves as one such platform for CDSDL (Cheng et al., 2021)^[1].

To improve the accuracy of the Technology Acceptance Model (TAM) in predicting behavioral intention to use Chinese Danmaku video sites for self-directed learning strategies (CDSDL) in the Chinese context (Zhu, Bonk, & Doo, 2020)^[2], the sustainability of CDSDL adoption in China is evaluated using an extended TAM model that incorporates Task-Technology Fit (TTF), Facilitating Conditions (FC), Individuals' Cultural Values, and individual cultural characteristics such as power distance, uncertainty avoidance, masculinity, and collectivism Figure 1.

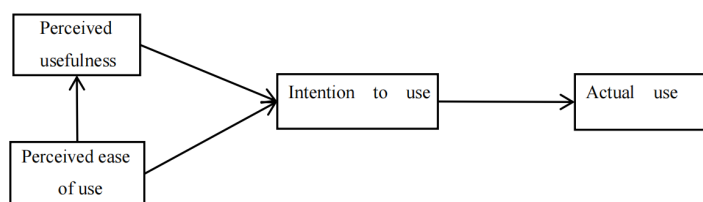


Figure 1: Technology Acceptance Model (TAM)

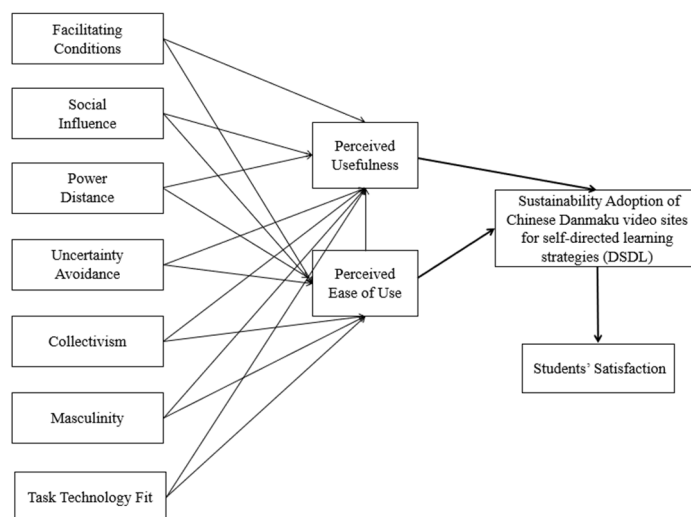


Figure 2: Theoretical Framework for the CDSDL

There may be variations in the definitions and characteristics proposed by different researchers, the core elements of Chinese danmaku self-directed learning(CDSDL) can be broadly categorized into autonomy, independence, and lifelong universality in. Figure 2.

Autonomy

The core of self-directed learning research is learners' autonomy and independence in all tasks. Self-directed learning stresses learners' autonomy and control over learning activities (Lemmetty,& Collin, 2021)^[3]. Self-directed learning embodies autonomy and independence. Learners can tailor their learning experiences to their preferences, preferences and styles by establishing goals, developing learning plans, and selecting learning tactics. and assess learning outcomes (Carpenter & Willet, 2021). This learning process might show the learner's subjective initiative and independent exploring capacity. But that doesn't mean self-directed learning should be socially isolated. It's not solitary learning. It might occur in an isolated setting or in a social setting. Self-directed learning cannot occur if people define it as a lack of external resources or support (Khodary, 2017)^[4]. Self-directed learning is hence less dependent on external direction.The Bilibili website has a wealth of educational resources in various fields of knowledge, students can choose their own platform, according to their own requirements to set the pace of learning, choose the teacher, to complete their own learning goals.

Flexible universality

Self-directed learning is flexible in terms of time and space, and takes into consideration the individual characteristics of learners. It can accommodate learners of all genders, ages, identities, and industries at any time, anywhere education (Lemmetty and Collin, 2021)^[5]. Learners can choose their learning time and place. They can either learn while working or learn from everyday life resources after work to merge learning and work.The Bilibili website is filled with a huge amount of freedom for students to download and study at any time of the day or night, completely independent of time constraints.

Lifelong

Individuals or groups of people cannot keep up with the pace of change in today's knowledge-based society, and so will be destroyed. So people advocate for a learning society that includes lifelong learning and education for all. Learning is a social behavior that is tied to the long-term growth of society, and it is a personal behavior that is related to all stages of life development.The learning resources on the Bilibili website cover a wide range of topics, with options available at any stage of life. A lifelong learning model is advocated for learners.

3 Students' Motivation to Use Chinese Danmaku Video Sites for Self-directed Learning

Instructional videos are one of the most important resources to support online learning. However, current online teaching videos continue to emphasize one-way information transfer, and learners frequently lack emotional communication and timely feedback during the learning process (Lin et al., 2018)^[6]. In addition, in traditional online educational videos, learners often learn the content in the videos in a passive capacity, and continuous learning often makes learners feel bored and monotonous. The learners' learning enthusiasm is low and the learning continuity is

not strong (Chen et al., 2019)^[7]. Although most online education platforms have a message or comment section, due to the lag in comment time, learners cannot get timely feedback, and the learning effect is often poor. Users can send or read Danmaku at any point during the learning process. Compared to regular comments, Danmaku has the added dimension of video time points. Danmaku interaction enables learners in different times and spaces to communicate, with others acting as witnesses to these exchanges (Poquet et al., 2018)^[8]. This interactive mode significantly reduces learners' sense of isolation, fosters interactions between teachers and students, and facilitates peer-to-peer engagement, creating a mutual sense of presence. In conventional online courses, social interaction is often limited due to the separation of learning videos and the comment section on platforms. Learners watch videos and communicate in separate areas, leading to fragmented learning experiences and interactions. In Danmaku-based online learning videos, users receive video knowledge while simultaneously reading Danmaku comments in a unified manner. Users pay attention not only to the learning video itself but also to the communication occurring through Danmaku. Thus, learners express their opinions, derive joy from the process of Danmaku communication, and establish a sense of identity, motivating other learners to join in the discussions. While teachers may not directly respond to learners, students can leverage the attention given to other learners' Danmaku comments.

4 Teaching and Learning Theories

Teaching and learning theories provide frameworks for understanding how individuals acquire knowledge and skills in educational settings. In this study, we will discuss various teaching and learning theories that can be applied to the context of Chinese Danmaku video sites for self-directed learning (CDSDL) in higher education. These theories will shed light on the instructional strategies and approaches that can enhance students' learning experiences on platforms like Bilibili. The following section provides an in-depth analysis and explanation of ten key teaching and learning theories.

4.1 Social Constructivist

Constructivism is a learning theory that emerged and developed in the late 20th century. This theory is the research result of the famous psychologists Piaget, Sternberg, and Vygotsky. The theory believes that learning is a process of cultural participation. Community practices to build relevant knowledge systems. Its core ideas inherited cognitive information processing theory, viewing the learning process as the reprocessing and reconstruction of knowledge by learners. Constructivism emphasizes the active construction of knowledge by learners through their experiences and interactions with the environment (Jonassen, 2020)^[9]. It argues that true internalization of knowledge must be constructed by learners based on their own knowledge foundations, while teachers guide and assist learners in breaking through the zone of proximal development in specific contexts. Social constructivism builds on the principles of constructivism and stresses the social nature of learning (Vygotsky, 2021). This theory focuses on the subjectivity and autonomy of students in the process of learning mathematics, while emphasizing that learning is not just an individual behavior, but a process of cultural participation. With the development of multimedia and network communication technology, the teaching support and practice methods of constructivist teaching ideas are becoming more and more abundant. The superior characteristics of information technology over time and space,

with the blessing of audio and video technology, can make it simulate real situations. Online teaching provides richer teaching resources.

In CDSDL, As a new type of social learning platform, "Bilibili" just meets the needs of building this kind of learning atmosphere. Functions such as danmaku, comments, and online voting create an instant online interactive atmosphere, which has revolutionized the way most online learning platforms rely on comments. This instant interaction is conducive to further awakening the subject consciousness of Chinese learners, and taking students' existing knowledge construction and social experience as favorable conditions for self-directed learning meaning construction. Learners engage with Bilibili's content and community to construct their own understanding and meaning through interactions, discussions, and reflection. Learners on the BILIBILI website develop learning plans, set goals, complete tasks based on their own situations, find like-minded learning partners for interactive learning and mutual supervision, and continuously achieve self-improvement. By participating in practical activities inside and outside the classroom of a specific community, learners take the initiative to construct relevant knowledge, develop relevant skills, and improve their own qualities.

In CDSDL, learners collaborate with peers on Bilibili, sharing knowledge, perspectives, and co-constructing meaning through interactions and discussions. Learning requires not only the learner's active absorption of the learned knowledge, but also exchanges and discussions between learners.

4.2Others Learning Theories

Connectivism: Connectivism highlights the importance of networked learning and the ability to tap into external resources and networks for knowledge acquisition (Siemens, 2018). CDSDL platforms like Bilibili provide learners with access to a vast network of resources, experts, and communities, enabling them to learn from diverse perspectives.

Self-Directed Learning: Self-directed learning focuses on learners' autonomy and agency in taking responsibility for their learning process (Knowles, 1975). CDSDL platforms empower learners to take control of their learning journey on Bilibili, allowing them to choose content, set goals, and monitor their progress.

Experiential Learning: Experiential learning emphasizes the importance of learning through direct experience and reflection (Kolb, 2014). CDSDL on Bilibili offers learners opportunities to engage in hands-on activities, experiment with new concepts, and reflect on their learning experiences.

Cognitive Load Theory: Cognitive load theory explores how learners process information and manage cognitive load during learning tasks (Sweller et al., 2019)^[10]. CDSDL platforms like Bilibili should consider the cognitive load imposed on learners, ensuring that the content and interface design are optimized for effective learning.

Multimedia Learning Theory: Multimedia learning theory examines how different forms of multimedia (text, images, videos) can enhance learning outcomes (Mayer, 2017). CDSDL platforms should leverage multimedia elements on Bilibili to present information in a manner that facilitates comprehension and retention.

Social Learning Theory: Albert Bandura (Albert Bandura) is an American psychologist of new behaviorism. As the founder of social learning theory, his social learning theory clarifies how people learn in a social environment, thus forming and developing his personality traits. This theory believes that people can learn a certain complex behavior or develop a certain character by observing the behavior of others, imitating and learning, so it is also called "model imitation theory". Social learning theory emphasizes the role of observation and modeling in the learning process. CDSDL platforms like Bilibili provide opportunities for learners to observe and learn from others through video content, live streaming, and community interactions.

Andragogy: Andragogy focuses on the principles and strategies for teaching adult learners. CDSDL platforms should consider the unique characteristics of adult learners on Bilibili, such as their self-directedness, relevance-oriented learning, and the need for practical application.

In summary, these teaching and learning theories provide valuable insights into the design and implementation of educational experiences on CDSDL platforms like Bilibili. By considering these theories, educators and platform developers can create engaging and effective learning environments that align with learners' needs and promote meaningful learning experiences.

5 Self-directed Learning Practices: An Example from the Bilibili Website

At first, Danmaku, also known as bullet comments or barrage comments, refers to a popular feature in online videos, particularly in Chinese video-sharing platforms such as Bilibili. It allows viewers to post real-time comments that scroll across the screen, resembling a barrage of bullets. These comments are typically short messages overlaid on the video content, visible to all viewers simultaneously (Xiang and Chae, 2022).

The Internet's popularity has facilitated the rapid growth of online education websites, such as Chinese University MOOCs, NetEase Cloud Classrooms, and Wisdom Tree, providing diverse courses. Compared to traditional education, online education offers several advantages. Learners are not constrained by time, geography, or identity and can engage in learning activities freely (Peng et al., 2019). However, it is important to acknowledge that online education also has its drawbacks. One key difference between online education and traditional education is the relatively asynchronous and fragmented nature of interaction between teachers and students in online settings. There is a separation of time and space, as teachers pre-record videos and students access the corresponding materials at their convenience. As a result, students may experience a sense of loneliness during their learning journey, and the interactive teaching experience is often less engaging than that of a traditional classroom (Wang et al., 2020). While students can leave comments during online classes, these discussions can sometimes feel disconnected from the video's context. Thus, enhancing students' interactive experiences in video-based online learning, achieving timely interaction, and fostering learners' enthusiasm for learning pose significant challenges. The increasing popularity of learning videos on platforms like Bilibili has led to a growing awareness of the positive aspects of Danmaku interaction in reducing the sense of isolation during the learning process. However, one major challenge of online courses persists. Compared to traditional classrooms, teachers lack the ability to supervise students' learning progress, and learners' motivation can be weakened. Moreover, asynchronous course structures further separate teachers and students in terms of time and space,

devoid of real-time communication typical in traditional classrooms. Consequently, students may feel a lack of presence. However, when we summarize these shortcomings, we can observe that the characteristics of Danmaku videos seem to complement these limitations. Thus, the incorporation of Danmaku in online classroom learning may hold significant research value. In Danmaku interactive online learning videos, users can post Danmaku in real-time, presenting their ideas, replying to other Danmaku comments, engaging in entertaining interactions, and more. This process deconstructs and reshapes traditional learning behavior patterns.

Learners engage in self-directed learning on danmaku video platform by watching videos, interacting with danmaku, and engaging with video content to achieve the specific content and practices of their individual learning goals. The Bilibili platform provides a wealth of video resources including educational courses, lectures, tutorials, lab demonstrations, documentaries and entertainment programmes. These resources are usually presented in the form of online videos, allowing learners to choose videos that suit their learning style and preferences. Self-directed learning on danmaku video sites emphasises interactive and social learning. Learners can interact with other viewers through the danmaku commenting system on the Bilibili platform, asking questions, sharing insights, discussing content, and benefiting from the feedback provided by other viewers. This social interaction enhances the depth and breadth of learning. Learners on the Bilibili Platform danmaku video site regularly undertake self-assessment to measure their learning outcomes and determine whether they are achieving their learning objectives.

6 Self-directed learning improvement strategies

Diverse researchers hold differing views on the promotion tactics of self-directed learning. After a thorough review of the literature, the author has discovered that researchers primarily promote learners' self-directed learning from four angles.

Firstly, it is essential to enhance learners' knowledge and skills in self-directed learning. Self-directed learning is grounded in personal accountability, requiring learners to take responsibility for their own learning. Before embarking on self-directed learning, learners must first "self-awaken" to their own learning needs (Leary, Walker, Lefler, & Kuo, 2019).

Secondly, it is important to make reasonable use of learning materials and methodologies. In self-directed learning, the availability of diverse learning resources is abundant in our daily lives and workplaces, including both human and non-human sources such as books, newspapers, magazines, and the internet (Du Toit-Brits, 2018).

Thirdly, instructor guidance plays a crucial role in self-directed learning. Self-directed learning should not be seen as isolated from teacher-guided learning (Botelho & Bhuyan, 2021). Teachers in self-directed learning serve as experts, coordinators, planners, mentors, and supportive friends. To effectively guide students in their learning journey, teachers must truly understand the role of learning and teaching. Individualized learning approaches should be used to strengthen the foundations of teaching within real-life classrooms (Slater, 2018). Simultaneously, efforts should be made to inspire and encourage teachers to support self-directed learning (Lee & Jeon, 2020).

Lastly, creating a conducive environment for self-directed learning is crucial. This involves establishing a favorable learning atmosphere through the provision of materials such as libraries, museums, well-developed network technology systems, and learning platforms. In a humanistic setting, classmates, friends, and family members can also contribute to learning activities (Lee & Jeon, 2020)^[11]. Furthermore, replacing competition with cooperation in group learning fosters a supportive environment, reducing the perceived threat of learning and increasing learners' motivation (Bhandari, Chopra & Singh, 2020).

By considering these four angles of promotion, educators and researchers can effectively support learners in their self-directed learning journey, enabling them to take ownership of their education and achieve meaningful learning outcomes.

7 Conclusion

In summary, self-directed learning on danmaku video sites is a highly personalised and interactive learning mode. Learners have the flexibility to choose content that meets their needs and interests, and continue to improve their learning outcomes through interaction and reflection. This approach to learning requires self-directed learning, critical thinking and problem-solving skills that enable learners to effectively acquire knowledge and skills from danmaku video sites.

Reference

- [1]Alam, M.M.; Ahmad, N.; Naveed, Q.N.; Patel, A.; Abohashrh, M.; Khaleel, M.A.(2021) E-Learning Services to Achieve Sustainable Learning and Academic Performance: An Empirical Study. *Sustainability* 2021, 13, 2653.
- [2]Alvin Toffler. *The Third Wave*. Translated by Zhu Zhiyan, Pan Qi, and Zhang Yan. Beijing: Xinhua Publishing House, 1996:54
- [3]Bergamin, P. B., Bosch, C., Du Toit, A., Goede, R., Golightly, A., Johnson, D. W., ... & van Zyl, S. (2019). *Self-Directed Learning for the 21st Century: Implications for Higher Education* (p. 470). AOSIS.
- [4]Bhandari, B., Chopra, D., & Singh, K. (2020). Self-directed learning: assessment of students' abilities and their perspective. *Advances in physiology education*, 44(3), 383-386.
- [5]Brandt, W. C. (2021). Measuring Student Success Skills: A Review of the Literature on Creativity. 21st Century Success Skills. *National Center for the Improvement of Educational Assessment*.
- [6]Botelho, M., & Bhuyan, S. Y. (2021). Reflection before and after clinical practice—Enhancing and broadening experience through self-, peer-and teacher-guided learning. *European Journal of Dental Education*, 25(3), 480-487.
- [7]Carpenter, J. P., & Willet, K. B. S. (2021). The teachers' lounge and the debate hall: Anonymous self-directed learning in two teaching-related subreddits. *Teaching and Teacher Education*, 104, 103371.
- [8]Chen, L. L., & Aklikokou, A. K. (2019). Exploring factors affecting e-government acceptance in a developing country: The case of Togo. *Information Development*, 35(3), 394-408.
- [9]Chirag, B. A., Rathod, H., & Durgesh, N. M. (2021). Scope and Challenges of Self-Directed Learning in Undergraduate Medical Education: A Systematic Review (Systematic Review).

- [10]Combs.A.W..Humanistic Education:Too Tender For a Tough World[J].Phi Delta Kappan.1981(6):446-449.
- [11]Curran, V., Gustafson, D. L., Simmons, K., Lannon, H., Wang, C., Garmsiri, M., ... & Wetsch, L. (2019). Adult learners' perceptions of self-directed learning and digital technology usage in continuing professional education: