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Original Paper

Optimization of the Learning Process of Knowledge-based Short Videos: The Impact of Self-determined Motivation on Self-directed Learning Ability

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Abstract

The popularity of short videos has made knowledge-oriented short videos increasingly popular. They have positive effects in promoting the learning of short video learners but also face some process challenges. This research mainly analyzes the impact of self-determined motivation on self-directed learning ability. For this purpose, a questionnaire survey was conducted among 196 undergraduate students. The results show that in short video learning, self-determined motivation has a significantly positive impact on self-directed learning ability, especially the positive impact of intrinsic motivation in self-determined motivation on self-directed learning ability. However, in short video learning, the intrinsic motivation of short video learners is relatively weak. Based on the above research results, suggestions for enhancing the intrinsic motivation of short video learning are put forward. This research provides theoretical and practical guidance for educators and short video learners, aiming to optimize the application of short videos as a learning tool.

Keywords

Knowledge-based short videos, Short video learners, Self-determined motivation, Self-directed learning ability

1. Introduction

With the acceleration of the pace of life, short videos that meet the current social development trends and people's daily needs have become increasingly popular (Su, 2021). According to a survey report by CSM Media Research (2019), in daily life, if there is only one form of entertainment, 40% of netizens choose short videos, exceeding online videos. And the survey found that 32% of users watch short

videos for 10 - 30 minutes a day, and nearly 30% of users watch for more than 1 hour. Secondly, the rapid development of short video platforms, which are the production and dissemination media of short videos, also reflects the popularity of short videos. Taking Douyin as an example, it currently operates in more than 150 countries, has been translated into more than 75 languages, has more than 200 million users, and has a broad global market (Duan, 2023). In addition, short videos with audio-visual effects are not only a form of entertainment. Their concise and incisive characteristics can quickly capture people's attention and impart various information in a simple and natural way. On this basis, knowledge-based short videos with the orientation of knowledge dissemination are also increasingly favored by learners (Zhang, 2020; Zhang, 2024). Chen (2023) proposed that compared with traditional learning methods, among adolescent learners under 18 years old, 70% said they prefer to learn through short videos, that is, watch knowledge-based short videos. On the contrary, among the elderly learners over 50 years old, who account for a large proportion of the population, 55% also said they prefer to learn through short videos. The diverse, simple and convenient characteristics of short video learning attract learners of different age groups to participate in short video learning. Learning knowledge through short videos is widely loved by learners.

Meanwhile, some existing studies have already confirmed the positive effects of short videos on learning. Based on the high attention of learners in short video learning, Zhang (2020) proposed that from the perspective of knowledge dissemination, short videos can significantly enhance learners' learning abilities and skills in the learning environment. Chen (2023) explored the positive role of short video learning in enhancing learning motivation. Among them, 85% of short video learners indicated that the interactivity and entertainment of short videos could enhance their motivation to learn new words in the process of English learning. Moreover, placing learning with short video editing content in an active participation strategy can lead to a better understanding and development of critical thinking (Cui, Wang, 2008). Therefore, short videos have extensive positive effects on improving individuals' learning outcomes. On the contrary, some studies hold that short video learning also presents challenges in different aspects. For learners, if they lack corresponding self-learning motivation and planning, the fragmented knowledge provided by short videos cannot form a systematic framework, and learners are prone to develop superficial learning habits. Over time, it will be difficult for them to delve into the complete knowledge content in the videos (Fang, Xue, Guang, Li, 2024). Knowledge-based short videos integrate learning objectives into the videos. Through visual images, they can help learners gain a deeper understanding of the key and difficult points of knowledge. However, the lack of immediate interactive elements in short videos easily makes learners fall into passive learning during the learning process, thus making it difficult to stimulate learning skills such as critical thinking (Long, Abd Halim, & Hanid, 2023; Zhang, 2024). Based on the above studies, it can be seen that the learning results in the form of short videos are effective, while the potential threats may lie in the learning process of short videos. For this reason, most studies have put forward different suggestions to achieve a good learning process in short video learning, and these suggestions have a

certain relevance to the concepts such as internal motivation drive and autonomy advocated by self-determined motivation.

The research suggestions by Li (2023) state that to promote short video learning, the enjoyment and internal learning willingness of learners in short video learning should be enhanced. Because a stronger enjoyable experience will be conducive to learners maintaining a high level of interest during the short video learning process, thereby strengthening learners' internal learning willingness to learn through short videos (Zhou, Wang, & Cui, 2018; Li, 2023). And promoting the internal learning willingness of short video learners by enhancing the enjoyment of short video learning coincides with the purpose of cultivating internal motivation controlled by factors such as a sense of enjoyment. The research by Gao (2022), through exploring the relationship between short video learning and parental autonomous support, proposed that promoting short video learning requires cultivating students' autonomy and pointed out that learning autonomy is beneficial for cultivating learners' self-determined behaviors in short video learning (Lekes, Gingras, Philippe, Koestner, & Fang, 2010). It can be found that self-determined motivation and autonomy are consistent in promoting and cultivating individuals' self-determined behaviors, and autonomy is an important component in the self-determination theory (Deci & Ryan, 1995). It is not difficult to deduce that in promoting short video learning, it is necessary to cultivate students' autonomy, which can also mean that it is necessary to cultivate students' self-determined motivation. Through the relevant suggestions of the above scholars on short video learning, the factor of self-determined motivation is more or less implied in them, conveying the self-determined motivation of short video learning.

Apart from self-determined motivation, some other researchers have also found a close connection between the strategies for enhancing the learning effects of short videos and self-directed learning ability. For example, Ren (2023) proposed that in short video English oral learning, learners should be guided to actively write down their understandings and reflections after oral training, make oral learning plans, think and analyze, compare and monitor learning outcomes to enhance individuals' learning confidence, thereby stimulating personal subjective initiative. The research by Ye, Cui, Wang, Ye (2024) suggested that learners should actively set learning goals, have corresponding learning plans, be able to adopt effectively used learning strategies and conduct self-learning evaluations during the short video learning process. In addition, Lackner (2014) pointed out that in short video learning, learners should be able to adjust their learning progress according to their own needs and time, design personal learning schedules, and possess the ability of learning planning. Regarding the suggestions put forward by the above scholars for short video learning, self-planning, implementation, monitoring, and evaluation are mentioned, which coincide with the constituent elements of self-directed learning ability, namely self-learning planning and implementation, self-learning monitoring, and self-learning evaluation. Therefore, it can be found that self-directed learning ability is implicitly involved in short video learning, that is, the self-directed learning ability in short video learning.

In conclusion, the positive effects of knowledge-based short videos on learning have been confirmed by

most studies. However, there are still some challenges in the learning process. To address these process challenges, the learning strategies proposed by some studies for short video learners imply the positive roles of self-determined motivation and self-directed learning ability. It should be noted that since short video learners are using short videos as a tool to assist their learning, this psychological need stimulates individuals' actions and guides their behaviors towards a specific goal. Therefore, short video learners may have a certain internal motivation drive (Błachnio, Przepiórka, & Rudnicka, 2013; Ryan & Deci, 2000; Stone, Deci, & Ryan, 2023; Sun & Meng, 2023). Similar results have also been shown in other studies. The research by Fang, Xue, Guang, and Li (2024) explored the correlation analysis between the use of short videos and learning motivation among senior three students. It was found that among the surveyed subjects, the two factors that reflect individual internal motivation, namely the pursuit of personal achievements and the thirst for knowledge and progress, were highly correlated with the learning motivation of using short videos. Therefore, it is not difficult to find that learners in short videos have already initially possessed an internal motivation tendency. Meanwhile, the interestingness of short video learning and the convenience of information acquisition can further strengthen individuals' internal motivation (Hamsia, 2022). In addition, internal motivation can also affect individuals' self-directed learning ability (Gao, 2018). Coupled with the fact that in the research on related learning behavior processes, self-directed learning ability is regarded as an important process factor that is oriented towards learning results (Huang, Li, Meng, Lei, Niu, Wang, & Li, 2023; Kim & Lee, 2012). Therefore, in the field of short video learning, whether similar results will occur for learners' self-determined motivation and self-directed learning ability still needs to be further verified. Most of the current studies are related to short video marketing and information dissemination fields, while there are not many studies on short video learning. Moreover, there are challenges in the current short video learning process. It is necessary to explore the self-determined motivation and self-directed learning ability under short video learning so as to improve the learning efficiency of short video learners and provide more theoretical bases for optimizing the learning of knowledge-based short videos.

2. Research Foundation

2.1 Knowledge-based Short Videos

With the continuous reduction of information technology barriers and the continuous improvement of the digital literacy levels of students and teachers, the video teaching format has become a mainstream educational medium on the Internet and the main way of content delivery in online education (Laaser & Toloza, 2017; Yang, Zhao, & Ma, 2019). In the research by Vaganova, Markova, Smirnova, and Kutepov (2019), it has been proven that when video materials are applied to learning courses, they can strengthen students' educational and cognitive activities, develop visual thinking, improve students' visual culture, enable them to learn to perceive high-quality content, and process educational materials more quickly, thus promoting individuals' learning. However, video teaching may lead to the

emergence of other problems as the video duration increases. For example, in the research by Aragon and Wickramasinghe (2016), videos produced by Camtasia Studio 8 were used. These videos contained explanations of statistical concepts and key calculations. The research analysis showed that after listening to the lecture by Bligh (2000) for 10 minutes, the students' attention decreased significantly. Glance, Forsey, and Riley (2013), based on the statement of Khan (2013), also produced short videos and conducted in-depth research, concluding that the optimal time period during which students can maintain their attention is 10 - 15 minutes. Secondly, modern people are accustomed to perceiving information through visual images. Therefore, with the help of short videos, people can absorb more materials and perceive more information (Kustov & Livshits, 2017). In the experiment by Ding, Xu, and Lewis (2023), the students who watched short videos were significantly better than those who followed the virtual teaching by teachers, that is, the teaching method of making the teaching process into an animated cartoon. Short videos have certain advantages in promoting individual learning. Therefore, as an educational tool, only when learners use videos appropriately for learning will it contribute to the behavior of deep learning (Mitra, Lewin-Jones, Barrett, & Williamson, 2010).

In recent years, the transmission forms of video information content have also begun to develop in a situation of being diverse, concise and convenient, and have gained extensive recognition and acclaim on various social media platforms (Duan, 2023). This form of video is known as short video, which is characterized by a low production threshold. Users can access rich information in a short time and it is also easier to use during fragmented daily time, being able to meet the information intake needs of people under the fast-paced life (Yang, Zhao, & Ma, 2019; Zhang, 2020). Taking China as an example, according to the 52nd Statistical Report on the Development Status of the Internet in China, by June 2023, the total population of Chinese netizens had reached 1.079 billion, and the Internet usage rate was as high as 76.4%. Among them, the user group of short videos has exceeded 1.026 billion, and the proportion of users' usage has also exceeded 95.2%, which fully demonstrates the huge market scale and great potential of short videos. For users, as long as the network connection is available, they can easily access the short video platforms. It is precisely this convenient usage condition that enhances users' motivation to obtain information and at the same time provides a favorable online learning environment for learners (Zhang, 2020). The acquisition of knowledge information has become more easily accessible, and short videos are gradually becoming a daily learning method for learners. In the survey by iiMedia (2022), 56.8% of consumers prefer the short video form for course learning, and the number of people who pay for learning through knowledge-based short videos also accounts for 75.7%. In the survey by Liu (2022), 61.8% of people use their free time to learn and deeply explore knowledge through short videos, and 41.6% of people regard short videos as the preferred channel for knowledge query.

In addition, the learning effectiveness of knowledge-based short videos has also been confirmed in most studies. In terms of the improvement of self-directed learning ability, the research results of Ren (2023) show that short videos can improve college students' self-directed learning ability as well as the

learning effectiveness of spoken English. Secondly, in terms of self-directed learning motivation, through the research on the relationship between the use of short videos and learning motivation, Fang, Xue, Guang, and Li (2024) found that knowledge-based short videos are positively correlated with the social orientation dimension of learning motivation. McPheron, Thomas, and Palm (2018) produced 20 short videos of circuit courses each less than 5 minutes long and observed the learning outcomes of students after watching these videos. The results showed that the scores of students in the final examination were 8.36% higher than those of similar students who took the same examination in the previous year, indicating that learning through short videos can improve students' academic performance to a certain extent. However, there are also some challenges in the learning process of short video knowledge. Although the knowledge in short videos is usually imparted through easy-to-understand visual images and is easily accepted by ordinary audiences (Kustov & Livshits, 2023). But if an individual's learning enthusiasm and initiative are weak, due to the uneven quality of short videos, it is extremely easy to be interfered by bad content (Fang, Xue, Guang, & Li, 2024). Meanwhile, if there is a lack of corresponding self-learning motivation and planning, the fragmented knowledge provided by short videos cannot form a systematic framework, which easily makes learners develop superficial learning habits and makes it difficult for them to deeply study the complete knowledge involved in the videos (Yang, 2024). At present, the research on knowledge-based short videos is still in the preliminary stage, and it is also facing some challenges in terms of promoting learning effectiveness and carrying out daily learning discussions, etc. Relevant research is still needed for further verification and exploration.

2.2 Self-Determined Motivation

The Self-Determination Theory (SDT) is a motivational process theory about self-determined behaviors proposed by American psychologists Edward Deci and Richard Ryan in the 1980s. This theory respects the active role of individuals in the motivational process, regarding self-determination as the ability that drives individuals to autonomously choose learning behaviors. It focuses on the internal tendency and autonomous initiative of individual behaviors, emphasizing that self-determination is a basic need of individuals and that everyone has the motivation for self-development and self-actualization (Ryan & Deci, 2000; Huang, 2024). As an important concept in the Self-Determination Theory, self-determined motivation also emphasizes people's willingness and motivation to pursue self-growth, continuously develop themselves, improve themselves, and change themselves. It is the initiative and degree of self-determination in making choices about a certain psychology and behavior, mainly highlighting that people, on the basis of recognizing their own needs, ability needs, belonging needs, and the external environment, pursue the potential that is conducive to the development of their own abilities and the achievement of goals (Ren, 2024). Therefore, self-determined motivation plays a decisive role in transforming certain personal choices into actual actions and is of great significance in promoting personal growth (Nirje, 1972). Meanwhile, Blaschke (2018) pointed out that self-determined

motivation and digital media have created an integrated educational environment for cultivating lifelong learning and are an important variable necessary for the internal synchronization of learners.

According to the motivational intensity of self-determined motivation, the ascending order is amotivation, extrinsic motivation, introjected regulation motivation, identified regulation motivation, and intrinsic motivation. Amotivation is a type of motivation lacking the willingness to act. People in an amotivated state often do not attach importance to their behaviors, do not think they are suitable for what they are doing, and do not expect to obtain the results they desire (Deci & Ryan, 1995; Bandula, 1986; Seligman, 1975). Extrinsic motivation refers to taking actions under non-self-determined circumstances to obtain external rewards or avoid stress or punishment (Ryan & Connell, 1989). Deci and Ryan (1986) pointed out that when external rewards or constraints disappear, the behaviors will also disappear accordingly. Introjected regulation motivation has some internalized tendencies compared with extrinsic motivation and is the inherent driving force for individuals to carry out activities, such as the interest, enjoyment, and pleasure of the activity itself. Compared with extrinsic motivation, individuals are more inclined to perform behaviors generated by internal stimuli (Deci & Ryan, 2004; Bao, Cai, Li, Chen, Dong, & Wang, 2022), rather than their internal satisfaction. Identified regulation motivation, as a motivation for pursuing self-identification and value goals, is reflected in an individual's perception of the value of personal motivation for personal development (Noels, 2013). Intrinsic motivation, as the most motivational type of motivation, refers to learning activities carried out for the internal satisfaction of the activity itself, such as learning interest, fun, and satisfaction (Chen, Li, & Yang, 2024), and is a learning booster from within the students (Slameto, 2003). Looking at each of the above motivation types, they all have positive significance as positive variables in the process of promoting the exploration of self-determined motivation. However, among the constituent elements of self-determined motivation, the two factors located at the far right end of the continuum and with the strongest motivation, namely identified regulation motivation and intrinsic motivation (Huang, 2024). Compared with other motivations arising from external reasons or internal pressures, they have a more important positive contribution in terms of the learning process and the measurement of learning quality (Reeve, Deci, & Ryan, 2004). Therefore, this study selects these two factors to measure the strength of self-determined motivation.

In addition, the self-determined motivation perceived by college students will directly affect their self-directed learning ability. The higher the self-determined motivation is, the better learners can control themselves in terms of cognition, motivation, and behavior, and they are good at using cognitive strategies, thus better improving their learning ability (Cha & Eom, 2018). It can be seen that there is an inseparable connection between self-determined motivation and self-directed learning ability. Moreover, the role of self-directed learning ability in the online education system is becoming more and more prominent (Song & Hill, 2007). Exploring the connection between self-determined motivation and self-directed learning ability can provide more targeted plans for the development of learning activities. Taking the two variables of identified motivation and intrinsic motivation, which are

highly positively correlated in self-determined motivation, as examples. In terms of improving learning creativity, Ryan and Deci (2000) pointed out that intrinsic motivation will lead to high-quality learning and creativity and enhance self-directed learning ability. For example, in his research, Gao (2018) explored the relationship between intrinsic motivation and self-directed learning ability. By measuring from five dimensions, it was found that the two are highly positively correlated. The research by Goharimehr (2017) explored the relationship between identified regulation motivation and English learning. It was found that if the concept of learning a second language is part of the learner's identity, it will make the learner more motivated to learn it. And with higher motivation, students will invest more in learning the language. As the motivation increases, the individual's self-directed learning ability has also been improved to a certain extent. Therefore, currently, in the exploration of the relationship between self-determined motivation and self-directed learning ability, the relationship between the two has significant significance in improving learning creativity and carrying out online education.

2.3 Self-Directed Learning Ability

Henri Holec put forward the concept of learning autonomy in 1981, proposing that autonomous learning is the process in which people are responsible for their own learning during the learning process (Yu, 2024). In this process, regardless of whether individuals receive help from others or not, they are able to self-actively diagnose learning needs, set learning goals, adopt and implement appropriate learning strategies, and evaluate the learning results (Knowel, 1975). Therefore, autonomous learning mainly emphasizes the responsibility and autonomy of people in the learning process (Garrison, 1997; Whipp & Chiarelli, 2004). Its ultimate goal is to transform individuals into active participants in the learning process rather than passive recipients, and to become learners who can conduct in-depth exploration (Spencer & Jordan, 1999). It plays an important role in enhancing individuals' confidence, autonomy, motivation, and lifelong learning skills (O'Shea, 2024). In addition, the development of autonomous learning requires individuals to have corresponding self-directed learning abilities. Regarding the concept of self-directed learning ability, some scholars have defined it. Liu (2014) believes that self-directed learning ability is formed in the process of an individual's learning shifting from "being directed by others" to "being autonomous". Zimmerman (1988) holds that learners with self-directed learning ability can set clear learning goals, select appropriate learning methods, monitor the advantages and even the defects in the learning process, and evaluate personal learning outcomes during the learning process. Combining the above two viewpoints, self-directed learning ability can be briefly described as the ability of an individual with a clear learning plan and implementation scheme to implement learning monitoring and evaluation during the learning process. Meanwhile, the constituent factors of self-directed learning ability are reflected in Zimmerman's (1998) definition of the concept, namely self-learning planning and implementation, self-learning monitoring, and self-learning evaluation.

Self-learning planning and implementation refer to the ability of an individual to clearly define learning goals within a certain period of time and formulate corresponding learning strategies to achieve these goals. Self-learning monitoring is about the ability of an individual to eliminate distractions during learning, conduct conscious supervision, and adjust learning strategies in a timely manner. As for self-learning evaluation, it describes the process in which an individual accurately evaluates the achieved learning results and summarizes the learning process (Zhang & Xiang, 2023). Among them, self-learning planning and implementation, as the blueprint and practical part of learning activities, emphasize people's subjective initiative, that is, starting from the actual situation of the learner themselves, actively pursuing learning goals, contents, behaviors, and conditions throughout the whole process (Zhang, 2007). And self-learning evaluation is a key factor in ensuring the effectiveness of learning activities. Through self-learning evaluation, students can assess what they have done personally, cultivate their self-directed learning ability, and conduct effective learning (Macías, Cedeño, & Chávez, 2018; Avila-Salas, Sandoval, Caballero, Guiñez-Molinos, Santos, Cachau, & González-Nilo, 2012). The above two factors, being the most representative and operable elements, are easy to be quantified and measured through methods such as questionnaires. However, self-learning monitoring is largely influenced by students' conscious activities and may involve more complex psychological processes and behavioral manifestations (Wang, 2017), making it difficult to accurately measure it through simple questionnaires. Therefore, this study selects these two factors to investigate the self-directed learning ability.

Some research investigations have found that self-directed learning ability has a wide range of positive effects on individuals. O'Shea (2003) pointed out that individuals with self-directed learning ability can utilize their knowledge and skills in different situations. From the perspective of self-cognitive development, Obied and Gad (2017) explored the relationship between self-directed learning ability and critical thinking. Through experimental interventions, it was found that the experimental group was significantly higher than the control group in terms of the overall critical thinking rating scale levels. Secondly, in terms of personal development, Wichadee's (2011) research showed that if the cultivation of self-directed learning ability is incorporated into English courses, it will, to a certain extent, improve students' lifelong learning skills and promote the development of lifelong learning. Moreover, self-directed learning ability is one of the basic needs of learners in the online learning environment (Garrison, 1997). Geduld's (2016) research explored the relationship between high-level and low-level online learning and self-directed learning. The data results of the research indicated that learners with high self-directed learning ability have more advantages in all aspects of online learning. Due to the arbitrariness of the online learning environment compared to the traditional classroom, learners must take on the responsibility of planning, controlling, and evaluating their own learning processes (Karatas & Arpacı, 2021; Moore & Kearsley, 2012). And the online learning environment is learner-centered. When learners possess strong self-directed learning ability, it can, to a certain extent, improve learning effectiveness (Al Mamun, Lawrie, & Wright, 2020; Kuo, Walker, Schroder, & Belland, 2014;

Yükseltürk & Bulut, 2007). At the same time, from the perspective of emotional development, people with strong self-directed learning ability will actively seek an environment conducive to learning, thereby promoting individuals' internal motivation (Musal, Özan, Taşkıran, & Şemin, 2001). Looking at the above positive effects of self-directed learning ability on online learning, personal cognitive development, etc., having good self-directed learning ability plays an important role in mobilizing various potentials of learners (Williamson, 2007). However, current scholars' exploration of self-directed learning ability does not merely stop at its effects but emphasizes the interaction with other factors in specific learning environments.

3. Methods

3.1 Subjects

This study examined the relationship between college students' self-determined motivation and self-directed learning ability. Table 1 shows the demographic information of the research subjects in this study. In terms of gender, there are 75 male students (38.3%) and 121 female students (61.7%). Regarding the grade level, there are 44 freshmen (22.4%), 55 sophomores (28.1%), 51 juniors (26.0%), and 46 seniors (23.5%).

Table 1. Demographic Characteristics of the Research Subjects

Components		Number of people	Ratio
gender	Male	75	38.3
	Female	121	61.7
grade	1	44	22.4
	2	55	28.1
	3	51	26.0
	4	46	23.5
overall		196	100%

3.2 Instruments

The questionnaire developed by Jeon (2017) was used as the instrument for this study to measure self-determined motivation. The scale was measured using a Likert 5-point scale (1 = completely not - 5 = very much so). It consists of 11 items and 2 factors. The factors are divided into identified regulation motivation and intrinsic motivation. There are 6 items for identified regulation motivation, with a Cronbach's α of 0.909. According to the description by Hair, Black, Babin, and Anderson (2009), a Cronbach's α of 0.7 or above indicates good reliability of the scale. The items include "Learning is a very interesting thing.", "When I discover something interesting while studying, I will be fully absorbed.", "When I master the knowledge that I didn't know before, I will feel happy." and so on.

There are 5 items for intrinsic motivation, with a Cronbach's α of 0.885. The items include "I study because I think learning is a very important thing.", "I think learning is a way to achieve my dreams.", "I study for my own future." and so on. The overall Cronbach's α for self-determined motivation is 0.924. In the exploratory factor analysis, the KMO value is 0.915 > 0.6 level, and the cumulative contribution rate is 69.201%, indicating good explanatory power. Factor 1 includes A1 - A6, which represents identified regulation motivation. Factor 2 includes A7 - A11, which represents intrinsic motivation.

Table 2. Exploratory Factor Analysis of Self-Determined Motivation

factor	items	components		Cronbach's α
		1	2	
Identity motivation	A3	.834		0.909
	A5	.785		
	A6	.781		
	A4	.773		
	A1	.768		
	A2	.745		
internal motivation	A11		.837	0.885
	A8		.823	
	A9		.814	
	A7		.710	
	A10		.671	
Contribution rate%		37.675	31.527	
Cumulative contribution rate%		69.201		
KMO		0.915		

Autonomous learning ability used the scale of Hyo (2021) as the tool of this study, which was also measured by the Likert 5 subscale (1= not-5= very yes), consisting of 12 items and 2 factors, divided into self-learning plan and implementation, self-learning evaluation, see Table 3>. Among them, there are 8 projects of self-learning plan and implementation, with an Cronbach α of 0.920. The project includes "I plan to do before I learn.", "I will actively collect the knowledge and information required for the examination or to complete the homework.", "I can complete my study tasks independently, without being urged by others." There were 4 items in the self-learning evaluation, with a Cronbach α of 0.800. The project includes "I think the learning result is not good, and I will study harder.", "I will evaluate the task performance in the learning process.", "I will compare and analyze my own learning results with those of others." The overall Cronbach α for self-directed learning ability was 0.924. In the

exploratory factor analysis, the KMO value was 0.924> 0.6 level, the cumulative contribution was 64.261%, factor 1 included B1-B8, self-learning planning and implementation, and factor 2 included B9-B12, and self-learning evaluation.

Table 3. Exploratory Factor Analysis of Self-directed Learning Ability

factor	items	components		Cronbach's α	
		1	2		
Self-learning planning and implementation	B3	.834		0.92	0.924
	B4	.804			
	B1	.776			
	B5	.758			
	B2	.745			
	B7	.697			
	B8	.658			
	B6	.641			
Self-learning evaluation	B12		.783	0.800	
	B10		.744		
	B9		.724		
	B11		.714		
Contribution rate%		39.136	25.126		
Cumulative contribution rate%		64.261			
KMO		0.924			

3.3 Procedures

Because the online questionnaire has a low cost and no geographical sampling (Tan & Teo, 2000). Therefore, this study collected questionnaires through the online questionnaire star APP, and explained the research purpose and object to be determined in this study before answering the questionnaire. In the analysis of the collected questionnaires used for the SPSS 25.0 procedure, Firstly, the reliability analysis and exploratory factor analysis of self-determination motivation and self-learning ability are conducted; Secondly, the correlation between the two factors and the lower factors of the two factors was tested; Finally, according to the self-determined motivation and lower factors identity adjustment motivation, internal motivation on autonomous learning ability, self-determined motivation and autonomous learning motivation, internal motivation and lower factors identity adjustment motivation, internal motivation on the autonomous learning ability of self learning evaluation of regression analysis.

4. Results

4.1 Correlation between Self-determined Motivation and Self-directed Learning Ability in Short Video Learning

To collect the survey data of self-determined motivation and autonomous learning ability to Table 4, found in the relationship between self-determined motivation and autonomous learning ability, the correlation coefficient of 0.675, P <0.001, in the variables between the lower factors also present positive correlation, significant P <0.001.

Table 4. Correlation Results

components	Mean value	1	2	3	4	5	6
Self determines motivation1	3.71	1					
Identity adjustment motivation2	3.76	.921**	1				
Internal motivation 3	3.65	.896**	.652**	1			
Self-directed learning ability4	3.64	.675**	.595**	.635**	1		
Self-learning planning and implementation 5	3.61	.615**	.544**	.577**	.969**	1	
Self-learning evaluation 6	3.72	.647**	.567**	.612**	.829**	.665**	1
**p <0.01							

4.2 The Influence of Self-determined Motivation on Self-directed Learning Ability

In order to verify the influence of self-determining motivation on self-learning ability, multiple regression analysis was carried out. The results are shown in Table 5> of self-determining motivation as an independent variable and F=162.137 (p <0.001), β = 0.675, t= 12.733 (p <0.001). The descriptive power of the regression model was about 45.5%, indicating that self-determining motivation had a positive influence on self-learning ability. In the analysis results of the lower factors identity adjustment motivation, intrinsic motivation as independent variables, and autonomous learning ability as dependent variables, the regressed model was overall significant F=82.230 (p <0.001), identity adjustment motivation β =0.314, t=4.501 (p <0.001), with a significant positive effect. The intrinsic motivation β =0.430, t=6.165 (p <0.001), significant positive influence; explanatory power was 46 &, indicating that both identity adjustment motivation and intrinsic motivation will improve autonomous learning ability, while the effect of intrinsic motivation is higher.

In the influence of self-learning planning and implementation of self-learning ability, self-determining motivation was taken as independent variables and self-learning planning and implementation as dependent variables, and the regression overall significant F= 118.075 (p <0.001), β =0.615, t= 10.866 (p <0.001) had significant positive influencing factors. The description force of the regression model

was about 37.8%, indicating that self-determining opportunity positively affected the planning and implementation of self-learning. Lower factors of self-determined motivation identity adjustment motivation, intrinsic motivation as independent variables, self-learning plan and implementation as dependent variables, the regression model overall significant F=59.621 (p <0.001), analysis results are identity adjustment motivation β =0.291, t=3.895 (p <0.001), significant positive effect. Intrinsic motivation β =0.388, t=5.190 (p <0.001), with a significant positive effect, and an explanatory force of 38.2%. This indicates that both identity adjustment motivation and intrinsic motivation will improve self-learning planning and implementation, and that internal motivation has a higher influence than identity adjustment motivation.

In the influence of self-learning evaluation, self-learning ability as an independent variable and self-learning evaluation as a subordinate variable, the regression was overall significant F=139.351 (p <0.001), β =0.647, t=11.805 (p <0.001), with significant positive influencing factors. The description power of the regression model was about 41.8%, indicating that the self-determined opportunity positively affected the self-learning evaluation. Among the lower factors of self-determining motivation, identity adjustment motivation and intrinsic motivation as independent variables, self-learning evaluation as the dependent variable, the regression model was overall significant F=70.937 (p <0.001). The analysis results were identity adjustment motivation β =0.291, t=4.034 (p <0.001), which had a significant positive effect. Intrinsic motivation β =0.423, t=5.862 (p <0.001), had a significant positive effect, and a model explanatory power of 42.4%. This indicates that both identity adjustment motivation and intrinsic motivation will improve the evaluation of self-learning, and that intrinsic motivation has a higher influence than identity adjustment motivation.

Table 5. Effect of Self-determined Motivation on Self-directed Learning Ability

Affiliate variables	Independent variable	B	β	t	R^2	F	VIF
The ability of self-directed learning	Self determines motivation	0.632	0.675	12.733***	0.455	162.137***	1
	Identity adjustment motivation	0.273	0.314	4.501***	0.460	82.230***	1.741
	internal motivation	0.357	0.430	6.165***			1.741
Self-learning planning and implementation	Self determines motivation	0.647	0.615	10.866***	0.378	118.075***	1
	Identity adjustment	0.284	0.291	3.895***	0.382	59.621***	1.741

	motivation internal motivation	0.361	0.388	5.190***			1.741
	Self determines motivation	0.603	0.647	11.805***	0.418	139.351***	1
Self-learning evaluation	Identity adjustment motivation	0.252	0.291	4.034***	0.424	70.937***	1.741
	internal motivation	0.349	0.423	5.862***			1.741
***p < 0.001							

5. Conclusion

The aim of this study was to analyze the influence of learners' self-determination motivation on self-directed learning ability under short video learning, including a total of 196 undergraduate students. It was found that the level of self-determining motivation (M=3.71) was higher than that of self-learning ability (M=3.64), the lower factor of self-determining motivation (M=3.76) was greater than internal motivation (M=3.65), the level of self-learning (M=3.72) was greater than that of self-learning plan and implementation (M=3.61), and the positive correlation between self-determining motivation and self-learning ability. In the multiple regression analysis of self-determination motivation as independent variable, self-determination motivation can significantly influence self-learning ability positively (+). The influence of lower factors is intrinsic motivation (β =0.430) and identity adjustment motivation (β =0.314). This result is partly similar to the study of Cha, Eom (2018), Song, Hill (2007), respectively. The results show that the self-determination motivation of learners significantly affects self-learning ability, especially the influence of intrinsic motivation on self-learning ability. Identity adjustment motivation has a positive effect in improving the autonomous learning ability of short video learners, but it is slightly weaker than the influence of improving the autonomous learning ability in the internal motivation.

Secondly, self-determination motivation also significantly influenced (+) self-learning factor of self-learning ability (β =0.615), and the influence on self-learning plan and implementation was intrinsic motivation (β =0.388) and identity adjustment motivation (β =0.291). This is partly in line with the findings of Vallerand, Fortier, Guay (1997) and Sukkamart, Pimdee, Leekitchwatana, Kongpiboon, Kantathanawat (2023), that is, learners with certain self-determined motivation have certain learning goals and motivation for their own learning. In order to achieve this learning goal, Learners often take the initiative to plan, manage and participate in the planned and step-by-step self-oriented learning, namely, self-learning planning and implementation. However, the motivation

with high internal demand in self-determined motivation has some differences in the degree of learning initiative and execution than that guided by other external factors. learners with strong intrinsic motivation have stronger initiative and ability in self-learning plan and implementation. Therefore, the internal motivation in self-determination motivation has a stronger influence on self-learning planning and implementation than self-adjustment motivation.

besides, Self-determined motivation also had a significant positive effect on self-learning evaluation (β =0.647), The intrinsic motivation of the lower factor (β =0.423) is greater than that of the identity adjustment motivation (β =0.291), This result is partly similar to the findings made by Chen (2007) and Rafaila (2014), Learners who carry out self-learning plan and implementation alone can not understand and evaluate their own learning situation well, And give some learning feedback and reflection, Therefore, learners with a certain self-determined motivation to better test their self-learning effectiveness will often make self-learning evaluation. And have intrinsic motivation of learners than identity adjustment motivation learners, the motivation of the learning from their own demand for learning and improve the desire of the learning ability, for autonomous learning evaluation to adjust their own learning process of inner opportunities, so the intrinsic motivation of self learning evaluation influence tend to be stronger.

Finally, the present study confirmed the positive effect of self-determined motivation on self-directed learning ability during short video learning. Through the analysis of research data, short video learners in short video learning has certain drive (M=3.65), and in the self determination motivation, the average of learners identity adjustment motivation than intrinsic motivation, however in the regression analysis, higher influence than intrinsic motivation adjustment motivation to autonomous learning ability and the lower variable self learning plan and implementation, self learning evaluation influence. Intrinsic motivation has better contribution to the improvement of autonomous learning ability, while short video learners' intrinsic motivation is weaker than identity adjustment motivation. Therefore, based on the significant influence of the internal motivation of current short video learners on their autonomous learning ability and the phenomenon that the identity adjustment motivation of current short video learners is stronger than the internal motivation, improving the internal motivation of short video learners is more effective for improving the independent learning ability of short video learners.

In view of the remarkable effect of the above intrinsic motivation for improving the autonomous learning ability of short video learning, the following are the suggestions on improving the intrinsic motivation of short video learning. Short video creators can avoid the monotony of learning through rich forms, enhance the learners' curiosity and desire to explore, and then enhance the inner motivation of the learners (Zhipeng & Abd Rahman, 2024). To improve the pleasure of short video learning, Wang (2023) pointed out that maintaining a positive and optimistic attitude helps to increase the internal motivation of learning, and this is also true in short video learning. The pleasure experience of short video learning can attract short video learners to invest in it, thus promoting the internal motivation of short video learning. When learners have a good attitude to search for the short educational short videos

they need, they tend to interpret the required and appropriate content faster and more accurately. In addition, short video platforms can also establish proprietary areas for knowledge short videos to promote the sharing and flow of high-quality knowledge content. Learners share learning experiences and learning content in proprietary areas, creating a collective learning environment for learners, thus enhancing the inner motivation of short video learners (Wang & Zhang, 2022).

It is worth noting that in most of the studies on short video learning in the past, many scholars have rarely discussed the influence between self-determination motivation and self-directed learning ability in short video learning. The results of this study show that in short video learning self motivation significant positive influence on autonomous learning ability, especially the intrinsic motivation of self motivation to improve autonomous learning ability, the findings emphasize the important role in short video learning, can improve the short video learners have the ability to overcome the short video learning process challenges, so as to further improve the effectiveness of short video learning, to further optimize the current knowledge of short video learning provides a new perspective and theoretical guidance. Moreover, empirical analysis through the introduction of self-learning motivation and self-directed learning ability, which can also have theoretical significance for improving the shortcomings of existing studies. Because this study reveals in the short video learning self decision motivation of self-learning ability mechanism, provide the existing theory failed to explain the mechanism, especially in the verification of the previous study self decision motivation and autonomous learning ability part of the conclusion at the same time, also expand the knowledge of short video learning situation of self decision motivation and autonomous learning ability. This result can help the short video learners to understand the motivation of improving the learning efficiency, and also provide reference information for the producers of knowledge short video content.

Although the analysis of the self-determined motivation of short video learning and the ability of self-directed learning in the course of this study, some limitations are expected to be addressed in future studies. First, the sample size of this study was too small to determine whether there was a subjective deviation between the questionnaire content and the real short video learning situation, whether there was over-beautification, and the lack of objective measurement factors. Secondly, it is difficult to understand the self-determination motivation and self-learning ability in short video learning, which may have a certain impact on the result analysis. Future studies could consider a broader sample size survey or through interviews or observations to improve the credibility and breadth of the research results.

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