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## Abstract

The value that the Internet brings to the K12 education industry is reflected in four aspects: supply chain, efficiency improvement, experience optimization and clear output.

In this research, we first briefly introduce the K12 online education and its history of development. Additionally, we discuss the general features of the online educations according to analyzing the comments under the relevant applications.

Then we analyze the market of K12 online education in China, including the dominant applications in the current market, the business model, and the supply chain of the online education.

Next, we analyze the evaluation framework for online education which is proposed by Quality Matters as a model. Even though it is still very difficult to design a model that can perfectly evaluation the quality of online education, however, at least, according to the analysis, we see the possibility.

To analyze the satisfaction of the distance learning in K12, we design a questionnaire and receive responses from 218 student and more than 100 responses from their parents. Based on the data, we find the result is relatively positive. Evidence shows the potential bright future of online education.

Therefore, we use SWOT model to analyze and predict the future development of K12 online education from different dimensions. Finally conclude the research.

| Key words | K12, Online Education, Education Evaluation |
|---|---|

# CHINA'S K12 ONLINE EDUCATION RESEARCH UNDER THE EPIDEMIC

**Satisfaction Analysis on K12 Distance Learning**

Master´s Thesis
in International Business

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# List of Abbreviations

| | |
|---|---|
| SME | Small Medium Sized Enterprises |
| iNACOL | International Association for K-12 Online Learning |
| B2C | Business to Customers |
| O2O | Online to Offline |
| C2C | Customer to Customer |
| B2B2C | Business to Business to Customers |
| VLLA | Virtual Learning Leadership Alliance |
| QM | Quality Matters |
| SWOT | Strength, Weakness, Opportunities, Threats |
| PEST | Politics, Economics, Society, Technology |
| K12 | Education for Kindergarten to 12th Grade |
| SCM | Supply Chain Management |
| HR | Human Resource |

# 1 INTRODUCTION

## 1.1 Background

Apple ' s founder Steve Jobs raised a deep question before his death: "Why has IT changed almost all areas, but the impact on education is so small that it is surprising?"[1]

However, in recent years, with the popularity of the Internet, online classes have been gradually become a trend that many parents subscribe online courses for their children. However, it has still been difficult to form a large-scale. Nevertheless, this outbreak of the epidemic has made online courses from individual choices to the necessity of groups.

On February 17th, Wuhan[2] University started classes online, and on the first day, more than 20,000 students started classes at the same time. The same as primary and secondary schools across the country. No matter which subject the teacher teaches, he must quickly improve his skills to give online class. Like how to create PPT, how to use applications, etc. Although all kinds of complaints arose, it may be clear after many years that this week may be the key moment for the Chinese online class revolution.

Online education is divided into five major sections: early childhood education, language learning, K12 education (education for kindergarten to 12 years old), quality education, and vocational education. These five major sectors almost cover people's life-long education needs.

In China, due to the relationship between population density and values and national conditions, educational resources have always been scarce. Therefore everyone experiences very fierce competition at every stage of life. From the kindergarten interview to elementary school entrance examination, middle school entrance examination and college entrance examination, it is increasingly difficult to enter the society for employment.

The popularity in the capital market also represents the importance of K12 education. In China, the education is often regarded as the most important thing in a family. The "belief" of "entering a good university" is rooted in the hearts of every Chinese parents.

Because of this, K12 online learning industry developed very quickly. Although this market is developing rapidly, the market is not very mature due to the short development history. There are no monopolies. However, it lacks relevant legal provisions and regulatory provisions, lacks the standard evaluation model for the quality of the online course. In a word, there still exists many questions unclear.

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[1] In <Jobs Biography>, there is such a description. Jobs Proposed the question when Bill Gate paid a visit to him.
[2] The city which was the worst-hit in the epidemic in China

The epidemic popularize online courses which makes it easier for us to do relevant research. we analyzed the current status and predict future development trends of China's K12 online education. For the satisfaction of online teaching, we distributed questionnaires to 218 elementary and middle school students. The responses collected from the questionnaire were analyzed and related conclusions and hypothesis were drawn.

## 1.2 Research Question

Due to the pandemic, the approaches of learning and teaching methods in many countries and regions have been changed. China's K12 online education has also developed by leaps and bounds under such circumstances. Therefore, the research focuses on selected China, and aims to analyze the current situation of China's K12 market, the degree of satisfaction of students and parents with online education, and its potential opportunities and risks in the future. According to the research flow, this article mainly involves three research questions:

*Research Question 1: What are the current K12 online education market situations?*

*Research Question 2: Is there any framework to evaluate the quality of online education and standardize the performance to improve it?*

*Research Question 3: How students and their parents think of distance learning and what are the trends of K12 online education?*

The analysis provided a insight look of K12 online education and three research questions will be answered in different chapters in sequence.

## 1.3 Boundaries of the Research

Distance education has developed rapidly in recent years. This year, due to the epidemic, it has been expanded for development. Many schools have closed, but they still insist on teaching through the Internet.

But the development of K12 is limited after all. In recent years, although many excellent companies have appeared, the market is very dynamic and the competition is very intensive. All companies are still moving forward slowly in the exploratory stage. Neither business models and product types have not formed a mature system. Therefore, we could not to study the business model and product type too deeply.

In the third chapter of this paper, we discussed several business models and products, but did not discuss them in depth. Just analyze the market from the most typical representative products.

In Chapter 4, we did a questionnaire survey in order to study the degree of satisfaction of students and parents with distance education. A total of 218 students' responses and more than 100 parents' responses were collected. But for quantitative statistical research, this number is still relatively small.

At the same time, in Chapter 6, the SWOT method is used to analyze the development trend of K12 online education. However, there is overlap. SWOT requires brainstorming. Since this paper was completed by the author alone, it is inevitable that there are some points that are not comprehensive.

## 1.4    Research methods

In the second chapter, in order to analyze the general features and characteristics of K12 online education. We selected the top 50 applications in the app stores, and generated the comments of each applications. Then we used Python to listed the key words according to the frequency.

In the third chapters, it mainly analyze the development history of K12 online education and the current market situation of K12 online education. So we use a literature review for analysis.

When studying the effective evaluation framework in Chapter 4, we select the American standards framework as a specific case and analyze the instructors in detailed.

In order to analyze the satisfaction of distance learning, we conducted a satisfaction survey. Based on the generated data, we concluded some useful findings.

The main research methods are literature review and content analysis from market reports, white papers, comments and news. Through the analysis of second-hand information, sort out the current K12 online education market structure and product classification. Through Literature Review to analyze the framework model of K12 online education quality evaluation, conclude with recommendations about how to improve the quality of education through the model analysis. Additionally, we conducted a survey to analyze the satisfactions on online learning and the changes or differences when compared with face-to-face learning.

## 1.5     Structure of Thesis

As shown in Figure 4.1. The value that the Internet brings to the K12 education industry is reflected in four aspects: supply chain, efficiency improvement, experience optimization and clear output.

Therefore, we primarily analyzed the development history of K12 online education (Chapter 1). Then we focused on the four aspects mentioned above. We found the general features of online education. After that, we selected the most typical applications which are also dominant in the market currently. And found that the different types of typical applications have different target customers, different business models, and of course different educational supply chain (Chapter 2 & 3).

After the analysis of supply chain and efficiency, we started to analyze the elements of experience and output. In advanced we proposed another question, is there any mature online education evaluation framework? And we found that America has such a framework including hundreds of small indicator. We thus discuss it in Chapter 4.

Then we did a questionnaire survey to analyze the satisfaction of the students and their parents on distance learning. The finding are presented in Chapter 5.

Since we have discuss the history of the K12 online education, we then went further to analyze the future trends of it in Chapter 6 with the help of SWOT business model.

Then ended the thesis with a brief conclusion.

## 2    E-LEARNING AND ITS DEVELOPMENT

### 2.1    Definition of Online Learning

E-learning, also known as online learning, digital learning or computer-based learning, can be defined as education provided on digital devices that support learning (Clark & Mayer, 2016).

"K12" is also known as "K-12", called "Kindergarten to 12th grade", which means the scope of education from kindergarten to 12th grade in the American education system, and usually refers to elementary school to high school in China3. Under the competitive environment of university entrance examination, Chinese parents often require their children to take tuition classes after school. In this circumstance, China's K12 offline education market has developed very quickly and currently been matured. They mainly provides private schools, extracurricular tutoring and custody services. When it comes to online, it offers a wide range of supply categories and methods. In the past two years, the K12 online education industry has performed well, compared with the huge K12 offline education market.

### 2.2    Error! Bookmark not defined.

For online education, most of research scholars and consulting strategic enterprises, divide China's online education development into four stages: the budding period (1994-1996), the short-lived boom period (1996-2000), and the wandering period ( 2000-2010), rapid development period (from 2010 to present). Early online education in China was mainly led by the government, with universities and vocational training companies as the carrier, with academic education and vocational training education as the goals (Chen & Bao, 2014).

K12 online education is a field subdivided after the rapid development of online education, that is, in 2010. However, without the exploration and experience of early online education, K12 online education has no soil for budding development. Therefore, most of scholars believe that although actually there is no K12 online education in the early stage of online education, it is indispensable in the development process of K12 online education, the important premise and foundation.

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3 12th grade equals to 3rd grade in high school in Chinese Education System.

Therefore, some researchers divide China's K12 online education into two stages: the exploration period (the middle and late 1990s) and the booming period (2010 - present) (Liu, 2018).

The exploration wandering period is the first three periods in the development of online education, with a time span of 14 years. With the development of computers in the early 1990s when the Internet has just started, China has proposed a vision for building online education. In response to the national call, Tsinghua University[4] and other well-known domestic universities put forward the concept of distance education in colleges and universities (Hu et al., 2001). In 1996, the first primary and secondary education website, 101 online school, was established. With the support of the state, colleges and universities have set up distance education institutions, and within a few years, more than 30 distance education institutions have been approved. However, the education at this time is mainly based on academic education, and the form is mostly based on a single form such as text mail. The interactive form is not strong, mainly based on traditional education methods. The characteristics of the Internet and online education are not prominent, and primary and secondary education is also in the cracks (Ziyan Consulting, 2013). Due to these reasons, K12 online education barely survived, the effect was not good. Also, the public recognition was not high. It was not to mention popularization.

However, after 2010, the explosive development of technologies in mobile era has promoted the change in the quality of online education. The user experience has been largely improved because of the popularity of different alternative mobile terminals (e.g. iPad, laptop, smart phones, etc.) which provide various video and audio applications. Thanks to the rapid development of technology that made development of online education possible and had potential to become popular.

Even though the K12 online education faced very tough difficulties in development, nevertheless, it currently takes the priority in comparison with all the other areas in the online education industry (Liu et al., 2017) (Figure 2.1).

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[4] The best university in China
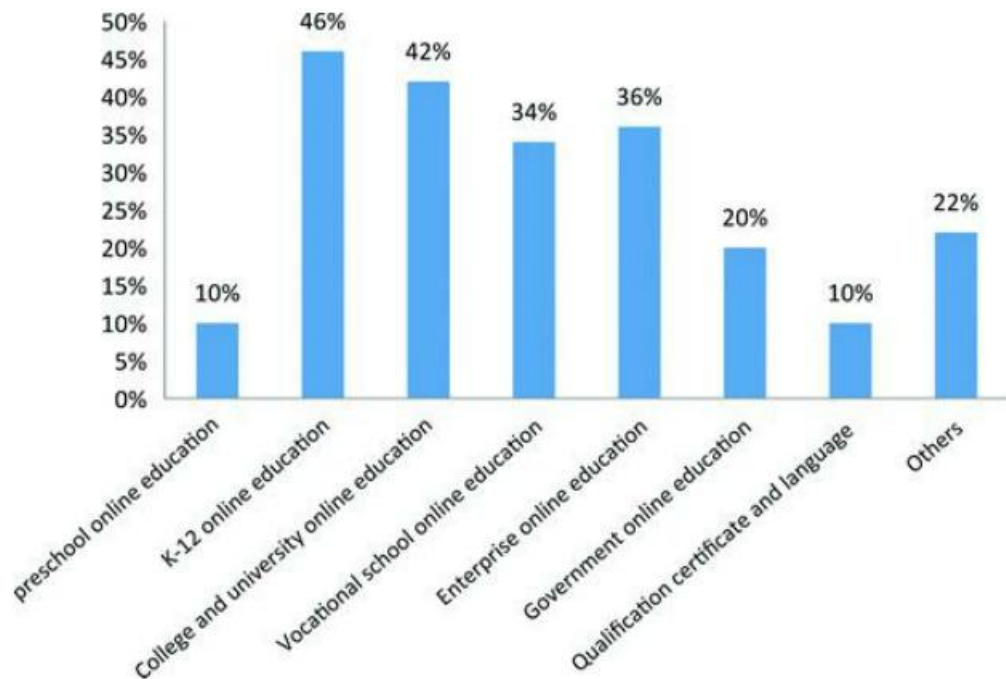
Figure 2.1 The Proportion of Online Education (Liu D., Huang R., Wosinski M. 2017)

According to the statistics report (iResearch, 2018), China's online education market has been rapidly expanding at a rate of 10% per year since 2010. By 2017, its market share had reached 51.8% and 298.7 billion yuan (Figure 2.2)



Figure 2.2  2012-2022 China K12 online education market scale and growth rate
(Source: iResearch Consulting Inc.)

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## 2.3    PEST Analysis: The Environment for the Development

PEST analysis is a method to help analyze the various macro forces that affect all industries and enterprises. It is also called the general environment, which helps to analyze the macro-environmental factors. Different industries and companies have different specific content of analysis according to their own characteristics and business needs. However, PEST Analysis of the main external environment factors generally contains four categories of impacts: politics, economy, society and technology (Baidu Baike).

### 2.3.1    Politics

Due to the very complicated historical reasons, for decades of years that majority of the Chinese parents can only have one single child in the family. However, from the recent several years, this policy has been loosed. The Open Second-Child Policy, has led to an increase in the number of children at school age. The demand for K12 teaching will further increase as the population of school age increases. At present, the Chinese education system still uses scores as an important indicator to assess students' progression. Scoring points will be a long-term need for K12 education. Therefore, Chinese parents will continuously invest a lot on their children's education under the intensive competitive pressure. According to the relevant research, the rate of parents who want their children to participate in tutoring reaches 90.9%, and the proportion of junior high school is even reaches 86.5% (iRearch, 2018).
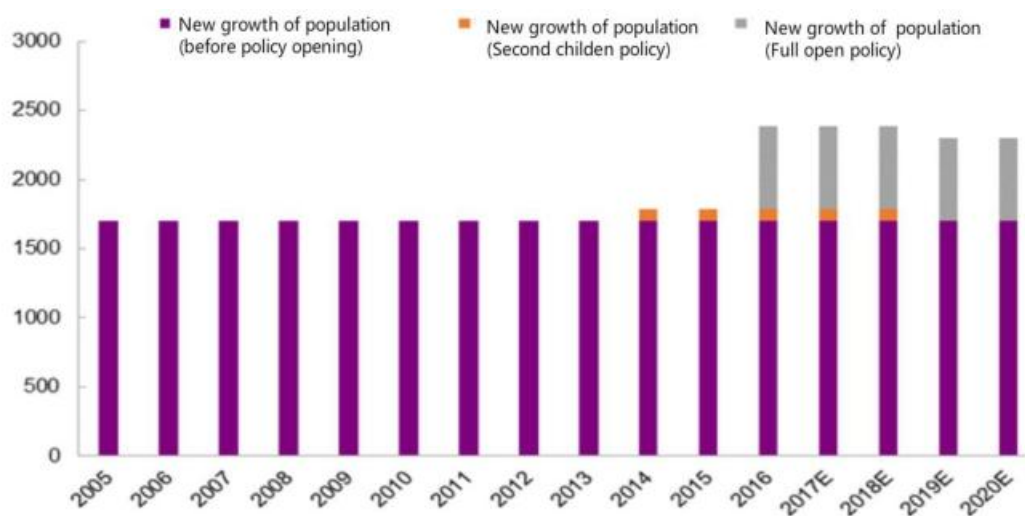


Figure 2.3  New growth of population (Source: iResearch, 2018)

Additionally, government has continuously published the incentives in Technology. In February 2016, in the official document, *List of High-Tech Fields Supported by The State* (2016), it was clearly stated that online educational institutions could also be regarded as high-tech companies and enjoy preferential treatment such as taxation.

in May 2018, the Ministry of Education released the *Action Plan for Education Information 2.0*, in which the policy stated that the establishment of a networked, digital, intelligent, personalized, and in-depth education system to build a learning for everyone, learning everywhere, at anytime.

Benefiting from various government policy incentives, there will be more and more offline education and training institutions actively using the power of Internet to deploy online education. The teaching and coaching market will become more competitive. The major well-known online tutoring education brands have seized the market forcefully.

Under the pressure of the epidemic, the Ministry of Education promulgated the policy of "School Suspension and Non-stop Learning", which promoted the rapid development of the online education industry.

### 2.3.2　Economy

The income of urban residents continues to increase. In 2004, the urban residents of first-tier cities exceeded 40,000 yuan5 per year, and the income grew rapidly annually. By 2018, even in fifth-tier cities, the general income exceeded 40,000 yuan, several times in the first-tier cities. Therefore, consumption is escalating. With the change of consumption concept and the upgrading of consumption structure, the proportion of per capita expenditure on culture, education and entertainment in the overall consumption has also continued to increase, reaching 13.3% in 2015 (Qi, 2019). In the process of family education in China, the investment in children's education is increasing, and the willingness to spend on education is increasing. 86% of parents have let their children participate in extracurricular tutoring (Founder Securities Report, 2018)

### 2.3.3　Society

High-quality educational resources are concentrated in first-tier cities, although the educational resources in the first-tier cities are not equal neither. In offline education, due to the numbers of schools and the the whole capacity, it is very difficult to get admission letters. However, the best educational resources are centralized in these ~~schools. They have the best~~ qualification of education, the best equipment and the most

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5 40,000 equals to around 5,000 euros

advanced methods. For example, in Shanghai, 243 high schools have only 51 key high schools, accounting for about 20%. High-quality education resources in second and other lower-tier cities are even more weak.

Unfair distribution of educational resources lead the middle-class families to increase their investment in child education and counseling, because they hope to achieve a future leap in children, which makes them to burden more pressure. When faced with the education of the next generation of children, top-level families have no worries, they gain several times the salaries, better networking. The unfair education distribution can further widen the gap between the next generation. The bottom families also have strong willingness to give their children more educational opportunities but they seldom have the chance and conditions.

Due to the distribution of households in China, wealthy households are only a minority, majority of the households are middle-income or low-income families. Therefore, online courses which can solve the problem of uneven distribution of educational resources have become an urgent need to solve this social problem. This demand will stimulate the development of online education.

Besides the unfair distribution of education, changes in the age structure of parents also affect the K12 online education industry. The people who born in post-80s and post-90s gradually became parents, which makes the structure of the whole society began to rejuvenate.The younger parents are generally educated and more open to the knew technology (iResearch, 2019). Their acceptance of the Internet is higher, and these parents are more willing to try online education as methods or solutions. This part of the parents grew up in the Internet environment, with a high degree of application and acceptance of the Internet (Figure 2.4).
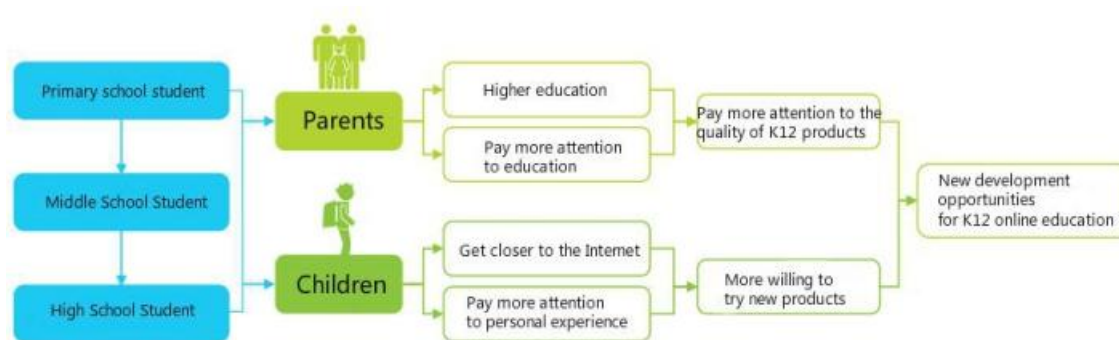


Figure 2.4  Changes in the age structure of Chinese K12 online education users

### *2.3.4    Technology*

5G is officially commercialized in 2019, and will be launched in 2020. 5G+ live broadcast can higher efficiency and lower cost. The first-stage application scenario of 5G, eMBB enhanced mobile broadband, will be applied on a large scale in 2020. The development of 5G technology will break the original online education solution that cannot be reached due to network problems. In the future, live broadcast, 3D imaging, VR, AI will develop faster and improve educational quality (Li et al., 2020). This makes it possible that more available and efficient methods will be developed in the future.

## 2.4    Features of K12 Online Learning

In China, K12 online education is different from other online educations. Because in China, university entrance examination plays a vital role that it is regarded as an opportunity to change children's fate of a lifetime. For this reason, both students and their parents are far more stressed than college students in terms of facing exams.

Therefore, for K12 teaching, the output of the courses is very important. How much progress a student has made after taking the course and how much test scores students have increased are decisive for educational institutions. Only with a good reputation can K12 educational institutions attract more students. It can be said that in China, K12 education is more important than any other educational industries, such as CFA, CFR, CPA, other vocational education or university education. Because K12 students and parents have particularly strict requirements on the quality of teaching in comparison than any other types.

Unlike in university education, teachers often don't care too much about whether students are motivated enough to study. K12 teachers need to communicate closely with students and parents to frequently give feedback. For the teachers, even how to improve students' enthusiasm and interest in learning has become an urgent problem to think about. In order to make the courses more motivational, many teachers and institutions adopt technologies to embed games as stimulation in their teaching (Hu et Meyen, 2011). Meanwhile, even though people are generally familiar with the Internet, however, better online instructors are significant (Imran et al., 2012).

In order to better understand how K12 students or their parents think of the online applications, the key features and the most obvious advantages and disadvantages, we select the comments under the top 50 K12 online education applications. With the help of Python, we grab the information efficiently, and then it automatically calculated the

frequency of the key words, and listed them from the highest. Based on the data analysis we draw the table as below.

**Table 2.1 Frequency of Key Words Shown in the Comments**

| *Frequency of the words* | *Key Words* |
|---|---|
| 468 | Low Cost |
| 432 | Convenient |
| 325 | Repeatable |
| 233 | Autonomous |
| 157 | Personalized Learning |
| 129 | Interactivity and Collaboration |
| 107 | Socialization and Motivation |

According to the table above, the detailed explanations are described as below:

- **Low cost and convenient.** The learning cost of online learning is very low compared with the charge of offline education, but the learning effects are almost the same. And students can fully use the fragmented time due to the flexibility of online education.

- **Repeatable (can be watched repeatedly).** Online learning can be repeated, so students can listen to or re-learn part of the content according to their learning needs, so as to better grasp what they have learned and fully consolidate the learning effect. Courses uploaded by online schools can basically be viewed and used repeatedly.

- **Autonomous learning.** Online learning is based on self-driven force learning. Self-driven autonomous learning believes that even though teacher plays a very significant role in obtaining knowledge, but the learners' motivation, self-drive force are the most important part. With the help of other people (including teachers and learning partners), their motivation might be stimulated. Thus, online learning, in some respects, can also help build or increase the capability of self-driven learning.

- **Personalized learning.** Online learning can achieve personalized learning very well. Students' study status could be various. They can arrange the learning schedule according to their own time, choose the learning content according to their needs, knowledge background, personal preferences, learning style, which effectively enhances the pertinence of learning and thus can improve the efficiency of personal learning. The courses can be more customized according to students' own learning situations.

- **Rich interactivity and collaboration.** With the development of technology, the methods giving online education increasing rapidly. Students have more choices,

and some of the methods, for instance live-broadcast can facilitate the communication. To a certain extent, it is similar with face-time that people can communicate in real time.

## 2.5 Advantages and Disadvantages of Online Learning

By the same method that mentioned in section 2.5 (i.e. analysis of the comments under top 50 applications), we also generate plenty of data about the benefits and disadvantages of online education according to the comments.

Online education is now an important learning method, which has its own special features, characteristics, advantages and disadvantages. Understanding the characteristics of online learning will help us choose the most suitable learning method, and also determine how this learning method should be used more effectively.

Of course, characteristics and advantages and disadvantages are inseparable, and characteristics will bring corresponding advantages and disadvantages. We have discussed the features and characteristics of the online education in the last section. Next, we will analyze the advantages and disadvantages of online learning according to a large number of online learning users' experience:

### 2.5.1 Advantage:

1) Save money. Especially for students who do not live in urban cities and do not have the education resource they need, they can take the online course instead of going to urban cities. It can help them save the transportation fees and accommodation fees, etc.
2) No need to spend time to go the schools. Once the learning content upgrade, students can download at the same time and start learning immediately.
3) No need to take very heavy books to school. The educational materials is basically digital. Students can only take a laptop or iPad. It is much more relax for them.
4) For difficult and important contents, through repeated study and thinking, to help understand and master the knowledge thoroughly.
5) Repeated learning can better review and consolidate the knowledge they have learned.
6) Avoid the "forget after learning" which is easy to appear in on-site classroom learning. In online education, students can discuss with partners, search the answer an explanation of the questions to enhance their study.
7) Equivalent to one-on-one teaching.

8) Students can schedule their own timetable. The can customize their curriculum according to their own study situation.Learning according to effectiveness, you can judge whether to continue to learn and consolidate existing knowledge, or should learn new knowledge according to students own learning status.

9) Study by interest, "Interest is the best teacher".

10) High efficiency, usually self-selected content, the learning initiative will be higher, and the learning efficiency will naturally be higher.

11) When discussing the problem, everyone brainstorms, there will be more and better solutions and solutions.

12) More and more online teaching functions make it easier for students to master knowledge faster.

13) Conducive to the development of communication skills and team spirit.

14) Conducive to making like-minded friends.

### 2.5.2    *Disadvantages:*

1) Must be able to access the Internet, which will cause inconvenience if there is no Internet.

2) May waste time and money. Especially for students who do not have self-drive learning force.

3) It is easy for students to have a psychological dependence, thinking that they can still learn again if they don't understand, resulting in a decline in learning efficiency.

4) High requirements for students' learning ability and self-discipline ability.

5) Lack of teacher's on-site guidance and constraints.

6) Only suitable for students who have a clear goal and a clear direction, otherwise they do not know what they should learn or how to learn.

7) Online communication is not as direct as face-to-face communication, students may not get the answers from the teacher in the real-time.

Through the analysis of the advantages and disadvantages of online learning, we might predict that if the disadvantages of online learning are made up by some means or technologies, online learning will have an absolute advantage over offline learning.

# 3      K12 ONLINE LEARNING CURRENT SITUATION

## 3.1      Market Size of K12 Online Learning

With the extreme fast development technology in recent years, the online education market has shown explosive growth, particularly the market of K12 online education.

2013 is known as the first year of the online education market, with an average of 2.6 online education companies established in this industry every day. Just like 2016 was called the first year of artificial intelligence (Sun, 2014)

In 2015, the number of students in elementary schools nationwide was 96.918 million, corresponding to 5.685 million full-time teachers; the number of students in junior high school was 43.119 million, corresponding to 3.4756 million full-time teachers; The total number of students in the K12 stage is about 180.4182 million, and 10.8561 million full-time teachers (data source: China National Bureau of Statistics ).

From the above data, it can be seen that the K12 crowd is about 200 million, and there is ample market space. Meanwhile online education industry is in a period of favorable policies since 2013, no strange that Internet giants and start-up companies have begun to invest and compete in K12 online education, which led K12 products have sprung up.

In 2020, during this special epidemic tough time, due to the extreme desirable needs of distance education, which stimulated the acceleration the development of K12 online education. According to the survey, the base number of primary and secondary school students in 2017 was 169 million. In 2017, the unit price of K12 teaching counselors was 5,600 yuan. The market size in 2017 was 473.5 billion yuan. The base of primary and secondary students is conservatively based on a 3% increase, and there will be 184 million primary and secondary students by 2020. The unit price of counselors will increase by 8%. By 2020, the unit price of counselors is estimated to be 7,386 yuan. The market size by the end of  2020 is estimated around 721.7 billion yuan. (data source: iResearch).

## 3.2      Typical Types of Current Online Learning Methods

With the continuous innovation and the rapid development of the Technology, online education has gradually become more and more popular, especially after the epidemic from 2020.

Combined with high-tech, for instance virtual reality, or artificial intelligence, online education likelihood has potential to meet the diverse and personalized needs of users in the future, and to make up for the shortcomings and defects of traditional offline education (Educational Entrepreneurship, 2020). According to survey data, the number of online education users in China will reach 309 million in 2020 (iResearch Report, 2018).

More and more education and training institutions and education companies have begun to deploy online education. In the current market, various forms of online education products are available on platforms.

Based on the data statistics from Qimai[6], the dominant applications were selected in the K12 online education market and classified into several categories of types (Big-Data Research, 2019). As shown in the figure below, the major three types of applications are extracurricular tutoring, Q&A tutoring and Question Bank (Figure 2.3)



Figure 2.1  Types of K12 Online Education Dominant Applications (Source: Big-Data Research, 2019)

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[6] It is a mobile product business intelligence analysis platform launched by Qimai Technology, covering App Store, Google Play and 9 major domestic Android markets in 155 countries/regions. It displays product list data for users in multiple dimensions.

### 3.2.1    Type of Q&A

There are several different approaches to propose questions and ask for help. For instance, according to "Baidu Knows", students can use picture recognition technology (i.e. take a picture of the textbook or take a screen shot) and then big data can identify the content of the students' photos and present the discussion of the same topic and analysis result to the students. Due to the convenience of taking pictures and searching for the answer to the questions, it may not be a good method for students with weak self-control: they might copy homework directly, rather than think of and solve the problem by themselves. Thus, although it is popular among student users, it is not liked by teachers and parents.

Similar to the product of "Baidu Knows", "Afanti" App provides two types of asking questions function. One is paid, the other one is free; If students want to get detail answer and explanation of the question, they can paid for asking teacher.

Students can not only ask questions in the applications, but also serve as helpers to answer other people's questions if they know, which also increasing interactivity and students' sense of accomplishment. Yet, because it is in the form of manual question and answer, basically, students cannot get a reply immediately after asking a question, and need to wait for a certain period.

However, some applications provide the service that students can directly communicate with the teacher through the APP to solve questions. "Call Teacher" provides a voice questioning section directly on the APP homepage; "Homework Helper" also provides a one-to-one question answering function.

This solution not only allows students to learn how to do a certain problem, the tutor can also explain to the students the knowledge points involved in the problem, and let them thoroughly understand how to solve the same type of problem. However, this kind of operation function has a higher cost than the form of taking pictures and searching questions in the communiity. It belongs to the function that only unlocked when customers paid the fees.

As the above analysis shows:

Different products have adopted different solutions for the students who  encountered difficult problems. These three solutions have their own advantages and disadvantages. Photo search can quickly present the answer to the certain questions of students, but it is doubtful about the effect of improving scores and really understanding how to solve the problems. However, due to the high efficiency and convenience, products such as "Little Ape Search", "Afanti" and "Homework Help" also have the function of photo search in order to gather student users through this function and obtain a lot of Traffic, and then convert the traffic to live broadcast, coaching and other paid functions to obtain profitability.

### 3.2.2    Question Bank

Many students use Internet products to do after-class exercises. Because of the question resources are very rich and generally are categorized in topics, students can enhance the knowledge by practicing the same type of problems, meanwhile, they can also count the number of questions they have done and the rate of correct. According to the data, it is more clear which topic of knowledge that they have already mastered, and which knowledge points that they need more practice. Additionally, it can helps teacher design test or quiz (Yildirim, 2007).

The question bank is always categorized according to each chapter or knowledge points. Students can do questions chapter by chapter or topic by topic. In the process of doing exercises, questions with wrong answers will be generated. Through the big data algorithm, it can calculate what knowledge points the student has mastered and to what kind of degree, which knowledge points they have not mastered. Then, according to the specific situation of each student, a suitable set of questions and study schedule will be settled. This method allows the students to do the fewest questions to achieve the best learning effect.

The products that provide the solution for this scenario are: "homework helper", "learning overlord", "homework box", "ape question bank", etc. This way of using big data technology and adopting different learning schemes according to each person's actual situation is called "adaptive learning" (Jeong, 1996).

### 3.2.3    Private Extracurricular Tutoring

If compared with other subjects, students have a specific subject which is the worst, and they want to have extracurricular tutoring on this course,  there exists some education applications on the market which are very suitable for these students and meet their needs.

Students can register on the institutional website. The institutions typically provide a window for information of the teachers display through the website or APP. Students can find lists of teachers which includes the teachers' basic professional experiences and contact information, then select the one preferable to conduct and book face-to-face courses both online or sometimes offline is available as well.

New Oriental Middle School, Gently Tutoring Institution, all use this form, of which "Gentle Tutoring" also provides teachers to teach offline, even at students' homes if the condition allows.

In 2016, the form of live broadcast suddenly became popular, and was successfully applied to different educational products, including K12 online education. Online

education live broadcast is generally divided into two categories: one is a single live broadcast, used to explain a knowledge point or learning methods, more flexible, more free, yet less systematic; second is a series of live broadcasts, used to systematically courses, such as advanced classes during summer or winter vacations, more fees (Liu, 2017). The existing products strategies are typically to obtain traffic through free live broadcasts and monetize by selling a series of courses.

In some series of courses, the teacher recorded the content of the classes in advance and placed them on the platform. The students can watch the video repeatedly. The advantages are that the cost is low, and the number of students attending classes at the same time far exceeds that of offline classrooms. The students from middle-income and low-income families can also enjoy the high quality of educational resources. However the disadvantage is the lack of real-time interactive, and now there is a tendency to be replaced by live broadcast which students can politely interrupt teachers and propose questions during the classes and get the answer immediately. Teachers can get feedback at the real-time.

### 3.2.4    The Development Trend of the Three Mainstream Products

According to the data from iiMedia Research, the core needs of parents in the K12 online education industry can be divided into fours types: 1) studying abroad-oriented (e.g. SAT, GMAT, TOEFEL tutoring, etc.); 2) elite-training tutoring; 3) school exams-oriented (such as extracurricular science or math tutoring courses); 4) to improve the quality of school education (such as education informatization).

With the development and gradual maturity of online education, additionally with the gradually clarified needs of teh parents and students, the development trends of the three types of mainstream products, which discussed in section 3.3.1 and 3.3.2 and 3.3.3, are also changing accordingly. For example, many of Question Bank's customer groups are using the products for the purpose of studying abroad, while some are for exam-oriented education. With the gradual subdivision of the industry, product functions are gradually becoming more and more specific (Figure 3.4).

In general, the family economic level corresponding to these four types of needs has been reduced, and the customer unit price has been reduced.

The scale of users is expanding one by one. Exam-oriented is currently the most mainstream requirement. With the reform of the national college entrance examination system and the expansion of the middle class, the demand for elite-training education will rise further. With the penetration of new technologies and new models from outside the educational system to the inside, the demand for improving the quality of education in schools will rise in the future.

At present, the entire industry is still busy exploring models, such as online subject tutoring, online children ' s English, online tools, and educational informatization. The four types of customer groups mentioned above have not been clearly distinguished in these models.

In the face of different customer groups, practitioners often adopt the tactic of accepting all orders. Parents and students are still trying different products everywhere. In the future, the online children's English products may will be the first type of online educational products to figure out different customer groups, clarify the positioning of its products, and provide valuable experience for the evolution of other tracks.



Figure 3.2 The Development Trend of Mainstream Products (Source: iiMedia Research)

## 3.3 Business Models of Online Learning

With the development of Internet technology, various industries have gradually integrated and upgraded with the Internet. K12 online education is a representative industry formed by the Internet-integrated education industry. In the continuous development, K12 education has gradually formed its own development model,. Meanwhile it is gradually showing its development prospects in the education industry.

Institutions move their place-based tutoring, instructions online, which largely decrease the financial cost and opportunity cost for students. According to the different methods and functions, the institutions not only developed various different applications, but also use different business models to attract their target customers and make them willing to consume.

In this chapter, three widely used business models of K12 online education are identified (Chun, 2018). In order to optimize the overall performance and increase the profitability, it is vital to figure out the key education providers and target customers (Burd et al., 2014). Meanwhile, each business model has its own specific characteristics and features and might have different impact on the education in the future.

3.1 Business Model and Its Features

| Business Model | Features / Characteristics |
|---|---|
| B2C | vertical education; lower cost; watch |
| C2C | quality control problems; avoid heavy |
| O2O | mixed online and offline; relatively |

The main business models of K12 online education are mainly divided into five types: B2C, C2C, O2O (Table 3.1). The details are explained as below.

### 3.3.1   B2C Business Model

B2C, business to consumer, a business model in which merchants sell products and services directly to users.

At present, most online education companies on the market belong to the B2C model, such as Yuantiku, 51Talk, etc. B2C teaching methods are also constantly evolving, from recorded courses to live broadcast & recorded broadcasts, from large classes to 1 to 1 & mixed classes.Grasping consumer psychology and fully meet consumer needs are significant for the institutions to increase their competencies.

Among all the business models, B2C has been proven to be able to make money which is the reason why institutions who basically use B2C model, like Hujiang, can get large amounts of financing. From the perspective of the investors, they also have confidence in this business model in education industry.

Online education companies in the B2C model generally take relatively vertical education fields as their main curriculum products, such as language training, vocational training, and skills training, due to their role as the main body of education. It solves the problem of online education standardization, and courses are generally reassuring.

As we all know, high-quality offline course content tends to be expensive, long-term, and slow updating, which is daunting. Online courses which are recorded in advanced can solve the problems. Because the biggest features of the recorded course are that all the courses in the series can be uploaded at once and watched repeatedly. In theory, more and more users can watch it to achieve cost amortization, and the marginal cost is getting lower. For this reason many giant institutions have invested heavily in the early stage to ensure the quality of the courses, which can reduce the negative impact of moving offline classrooms to online to a certain extent.

It is a great pity that due to the weak copyright awareness of some people, the hard-produced Internet digital content works are easily copied and re-distributed quickly, which seriously damages the legitimate rights and interests of the original content exporters. However, recently, the news notice of "*More than 6000 songs removed from the shelves*" was a good signal that the environment for copyright protection in China is getting better. The punishment and penalty of piracy.

### 3.3.2    C2C Business Model

Consumer to Consumer, A business model in which users put things on the platform to sell themselves.

C2C is also known as the platform model. The platform itself does not produce courses, it belongs to a third party to provide a technical platform for individuals or institutions who provide learning courses for users . Many famous e-commerce companies use this type of model, such as Taobao7 or Amazon. The essence of the platform model is to connect supply and demand (Guidry J.A. 2015).

When online education practitioners receive cash through the platform, they charge platform fees. For platform providers, the advantages are obvious: the platform model avoids heavy services and content, and only requires a certain fee. The platform is asset-light and is not responsible for products supply. As an intermediary, it only needs to solve the technical problem of information matching. In the whole process, many functions and content and teaching materials are need to be completed by the education suppliers.

Of course, it is not without cost to make a profit. Since it is not the exporter of product content, but only a intermediary, it will inevitably lead to the difficulty of controlling products  quality (Li.S, 2011). Taobao's fake products, Didi's8 fake and dangerous drivers, and Airbnb's fake photos. In the platform mode, quality control problems are almost impossible to solve (Yamamoto et al., 2015). Quality control may rely more on manual review of the platform.

### 3.3.3    O2O Business Models

O2O, namely from online to offline.

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7 Taobao is an e-commerce platform, belongs to Alibaba Group.
8 Didi, the Chinese version of Uber. There has been a tragic sensation: the murderer disguised as a driver, raped and killed a 20-year-old girl.

In the early days, group buying was the originator of the O2O concept. Group buying gained a lot of online traffic and introduced it offline. Since then, the O2O concept has gradually emerged.

In the Internet era, offline giant educational institutions have begun to conduct online education and teaching. Or some companies that originally did online education have begun to develop offline education and open up offline and online platforms. This online education model that combines online and offline is the O2O model (Zhu et al., 2016).

In the learning scenario, compared with other online education platforms, the O2O model mainly leads users and traffic offline through online. Learning is done offline (Xu et al., 2015). While other online platforms can generally teach online based on their business characteristics.

In terms of platform function, the educational O2O platform is more about collecting institutions and teachers information and then distributing it to users, which can improve user screening efficiency and expand choices to a certain extent. Additionally, it can bring traffic to the small size of educational companies. The O2O model is relatively simple, and is believed to have potential to earn hug profit.

The O2O model is more focusing on diverting users from online to offline institutions. As long as these business companies grasp the needs of users and attract users, charging is relatively easy. Meanwhile, it is in line with the traditional consumption habits of the public.

However, this model also has its own disadvantages, that is the O2O model has much higher requirements on operations and products (Li et Liu, 2018). Products need to match users needs and directly address users pain points. For example vocational training, education and training, whether these courses can bring actual benefits to users. Operation is based on mature products. The purpose of operation is constantly attracting new customers.

## 3.4    Market Supply Chain Structure

There are many research paper analyzed Supply Chain Management (SCM). However, majority of the researches focus on the brick and mortar industries, seldom research papers analyze SCM in service sectors, for instance, finance, education, etc. Yet education industry also has its own special supply chain which involves human resources, financial resources, output and profitability of the system. Habib (2011) proposed a generic framework of traditional education supply chain (Figure 3.1).

Therefore, a better understanding of educational supply chain can improve the performance, lower the cost of purchasing and increase the profitability.

Generally, the supply chain of traditional education is structured by the providers (e.g. schools, universities, etc.), the human resource (e.g. teachers, professors, etc.), and some mechanism who interconnect school to the most suitable students (Ramzi, 2018).
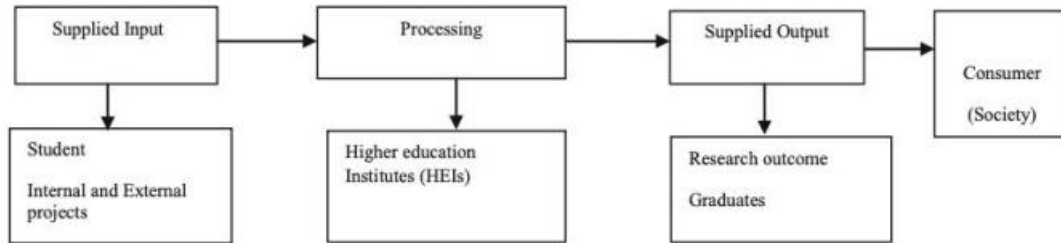


Figure 3.3 Generic educational supply chain management. (Source: Habib, 2011)

With the development of digitalization, online education has developed rapidly in recent years and has reached a point where it cannot be ignored (Morrissey, 2018). The differences between online education and traditional education differentiate their supply chain structure as well. Generally, the current supply chain structure consist several elements, teacher resources, technology support, distribution, etc., shown as (Figure 3.2).

In the early stage of the development of the K12 online education industry, the supply chain was very simple: tool development, platform building, and content research. Then reached customers through distribution and promotion. As some online education institutions have gradually expanded in scale, the specific supply companies which provide particular technologies and teachers or content to serve these educational institutions have gradually emerged. With the further development of the industry, a considerable proportion of offline forces have been added to the entire industry chain. Offline marketing methods have been re-emphasized, which means the supply chain of K12 online education is mixed. To optimize the performance of SCM, companies need to collaborate online and offline supply chain.

In this Chapter, the most important elements, technology provider, resource provider, platforms provider and content provider, will be explained in details as below.
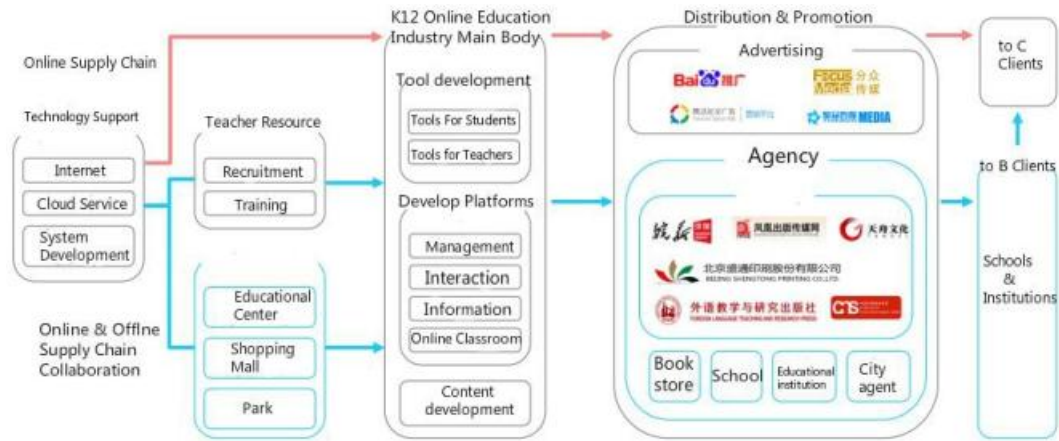
Figure 3.4 Supply Chain of China's K12 Online Education Industry

### 3.4.1 Technology provider

Technology providers are enterprises that provide online technical support for educational institutions, such as providing technical support for schools and governments, and forming education platforms. At present, YY Education and QQ Group can solve these technical problems for remote education. Because these companies focus on technology and focus on providing a full range of services, their professionalism allows them to enjoy the huge dividends of the rapid development of online education.

However, since K12 online education is still at the relative early stage of development. There exists plenty of uncertainties. Even though uncertainties sometimes means a lot of opportunities, nevertheless, the very short life cycles of products make the companies difficult to maintain their core competencies (Om et al., 2007). To survive in the intensive competition becomes even more difficult.

### 3.4.2 Resource provider

Resources basically consists two parts, the human resources (HR) (e.g. teachers, counselor, teaching assistant, etc.) and material resources (e.g. books, questions or quiz resources, etc.). In terms of human resources, some institutions recruit by themselves, some outsourcing the recruitment to some companies which provide HR service.

At present, most resource providers in the industry mainly focus on the question bank and video resources for student users. The question bank is the best entry point for basic education. Video is the most effective form of e-learning. Online education

companies pay more and more attention to the comprehensive utilization of resources and Interesting and vivid design of resource content to attract user stickiness.

However, question bank resources and video resources lack interactivity. No teacher controls student's learning behavior and students' learning process and learning effect are not guaranteed. These problems gradually appeared with the development of online education. Thus, many resource providers think of solution to solve the problems and improve customers using experience, which can contribute to the user's persistence and willingness to pay.

In addition, the comprehensive utilization of resources is mainly reflected in the realization of the test and evaluation of the question bank function, test paper composition, photo retrieval, and other functions, as well as multiple modes of video from the previous synchronous recording, broadcasting class to the current live class and open class. From the original the question bank and videos provide a variety of product forms that have been extended. Yet, the outcome of implementation of innovation technology, so far, is positive, in comparison with the offline education (Pierce & Cleary, 2014)

### 3.4.3    Platform provider

The platform provider aims to provide an intermediary platform between content providers and end users, and is mainly based on online institutions. At present, it can be mainly divided into two types: B2C and C2C. The B2C model refers to that educational institutions provide paid services directly to users, and can be divided into interactive and unidirectional according to the degree of user interaction. The C2C model refers to individuals providing education services to users. According to the profit model, they can be divided into two forms: C2C e-commerce and C2C community.

Platform providers have not yet achieved profitability. For example, technology giants Alibaba Education and Baidu Education have just tried and failed to profit. But in the future, as a large stream traffic enter the platform, after the establishment of consumer credibility, the growth rate of platform providers will increase significantly, and the rate will exceed that of content and technology providers. This is also the reason why Internet giants are scrambling to enter the field.

### 3.4.4    Content provider

In the online education industry chain, more content providers move offline education resources to the online platforms, and then sell them through third-party channels or

their own channels. Traditional education industry giants invest heavily in this link, but from the Internet perspective, this link is more like a copy of the offline education industry. The future development will be relatively stable. In order to exceed traditional educations, many content providers have made efforts to innovate new methods of education which are embedded with technology to improve the effectiveness and increase the interest or motivations of studying, for instance simulation games that strong related with the knowledge points.

# 4 EVALUATION SYSTEM OF K12 EDUCATION QUALITY

The value that the Internet brings to the K12 education industry is reflected in four aspects: supply chain, efficiency improvement, experience optimization and clear output.

In the last chapter 3, we have discussed the supply chain of the K12 online education and the efficiency of operation. In terms of these two aspects, the online education have surpassed the offline education.



Figure 4.1  Four major value elements of China's K12 online education industry

Yet, as shown in Figure 4.1,  no strange that it still faces the same problems as the offline market in terms of experience and output. Improving the output and optimizing the experience are much more difficult than improving the efficiency and supply chain. Because output and experience are more virtual that it is difficult to evaluate them. Only when we understand what framework is suitable and what are the most important elements in the evaluation model, we can solve problems in a targeted manner and improve quality.

In this chapter, we will discuss the evaluation model of K12 education quality. And apply the tool to analysis the current quality and give our advice to improve the quality.

United States have adopted technology in education for a long history, including online education. Their evaluation measurement framework is relatively more mature than the other countries. Thus, we did a case study to analyze how to evaluate the education quality with the framework.

Among the different online educational evaluation frameworks, the most widely used is the National Standard for Online Education Quality (iNACOL) which was established by the International Association for K-12 Online Learning in 2007 (Anderson, H.M, 2018). However, due to the emergence of new courses, new concepts, new technologies, and the updating of teaching practices in the past ten years, the original quality standard system has been unable to meet the needs of online education quality certification.

In 2019, the US Virtual Learning Leadership Alliance (VLLA) and Quality Matters (QM) jointly released a new K-12 online education quality national standard.  The

standard system includes *National Standards for Quality Online Programs*, *National Standards for Quality Online Courses*, and *National Standards for Quality Online Teaching*, shown as Table 4.1, which was revised on the basis of the national standards for online education quality released in 2011 (Lieberman, 2019). The new version of standards showing many new highlights.

 Below, we will discuss in these three dimensions in details. As shown in Table 4.1, each dimension has its own specific evaluation aspects standards.

Table 4.1  K12 Online Education Standards Evaluation Framework

| | | |
|---|---|---|
| K12 Online Education Standard | Project Quality Standards | Institutional standards |
| | | Curriculum standards |
| | | Support standards |
| | | Evaluation criteria |
| | Course Quality Standards | Course overview and |
| | | Course content design |
| | | Learner evaluation |
| | | Accessibility and |
| | | Technology |
| | | Course evaluation |
| | Educational Quality Standards | Professional responsibility |
| | | Digital Pedagogy |
| | | Learner participation |
| | | Digital citizen |
| | | Diversified teaching |
| | | Evaluation and |
| | | Teaching design |

## 4.1    National Standards for Quality Online Programs

There are four types of online education projects in the K-12 stage in the United States. Different types of online education projects have large differences in teaching methods, course forms, and support systems. Therefore, it is necessary to standardize the standards of online education at the project level to ensure the quality of online education. The newly revised *National Standards for Quality Online Education Program* includes four parts: 1)institutional standards; 2)curriculum and teaching standards; 3)support standards and; 4)evaluation standards. These four parts jointly

provide a comprehensive monitoring standard framework for the implementation of online education projects (VLLA&QM, 2019a).

### 4.1.1 Institutional standards

The first part of the online education project quality standards is the institutional standards for implementing online education. Institutional standards attempt to define eight critical components that create an operational framework for online education projects, including mission, governance, leadership, resources, and other eight standards:

1) **Mission statement.** The mission of the online education project is the foundation of the daily operation of the project and the guide to future strategic plans.

2) **Governance.** A high-quality online education project requires the establishment of clear governance institutions (e.g. governance committees, advisory committees, or school committees) and the transparency of their roles and responsibilities.

3) **Leadership.** The leadership team of the online education project is responsible for formulating the annual plan and strategic objectives, implementing the action plans at different stages, and communicating the progress of the project to stakeholders.

4) **Plans.** The strategic plan is consistent with the goals of online education, focusing on effectively meeting the needs of teachers and learners and reflecting and improving the efficiency of the organization.

5) **Organize employees.** Having a group of professional and well-trained faculty and staff is an important foundation for achieving high-quality online education programs.

6) **Financial and material resources.** The online education project has sufficient financial and material resources to ensure the sustainable development of the project, while implementing effective management of various resources in accordance with local, state and federal budget regulations and accounting principles.

7) **Equality and opportunity.** The policies and practices of online education programs need to ensure that students have equal access to project resources. Project faculty and staff must cooperate with learners and their families to provide personalized services for learners with different needs and comply with local policies and laws.

8) **Integrity and accountability.** Online education projects ensure transparent management and fair procedures, and regularly provide accurate and relevant information to future and current stakeholders, such as project progress, achievement of policies and standards, and students' academic achievements.

### *4.1.2 Curriculum and teaching standards*

The second part of the online education project quality standards is the curriculum and teaching standards, which mainly focus on how online education projects develop or select courses, how project teachers teach courses to students, and how to evaluate student progress. This section includes three major standards:

1) **Curriculum and course design.** Whether it is a course developed by an institution or other authorized course content, an online education project needs to adopt and implement an effective online instructional design method.

2) **Instruction.** The online education program provides students with high-quality teaching in a comprehensive and comprehensive manner, including five indicators: curriculum design and teaching practices are consistent with the online project's vision; teaching is guided by evidence-based practice; teachers self-evaluation process; and evaluation of academic Integrity.

3) **Assessment and learner performance.** A high-quality online education project values learners' academic achievements. Evaluations includes four indicators: the online project uses multiple methods to evaluate the achievement of the stated learning goals; Sexual evaluation provides information for appropriate targeted remedies or interventions; evaluation is consistent with learning objectives; and provides relevant standards for timely and effective feedback.

### *4.1.3 Support standards*

Support standards involve academic, administrative, mentoring, and technical support services provided by organizations, and they are the key to meeting the needs of online project participants. This section includes two major standards:

1) **Faculty and staff support.** Online education projects need to support teachers and employees by providing guidance, technical assistance and timely professional development; the project provides and encourages faculty and staff to participate in induction training and mentoring projects; teachers regularly receive feedback on their performance and student performance progress.

2) **Learner and parental support.** The online education project provides a series of support services for learners and their parents or guardians to address the needs of learners at different levels and different situations.

### *4.1.4    Evaluation criteria*

Project evaluation criteria can be used to test whether the project has achieved its intended purpose and to determine areas for improvement. The evaluation of online education projects includes internal evaluation and external evaluation. The internal evaluation is an informal evaluation, but it can provide timely and rapid feedback on the investigation area. External evaluation usually treats the entire project from an objective perspective, focusing on objective and comprehensive evaluation of the project's goals, tasks and progress, as well as internal evaluation process and results, and at the same time formulating and implementing improvement plans for the problems existing in the project. External evaluation can bring additional credibility to the results.

## 4.2    National Standards for Quality Online Courses

The revised K-12 *National Standard for Online Education Curriculum Quality* contains seven major standards, which are designed to provide guidance for curriculum content development, teaching design, and evaluation standards.

### *4.2.1    Course overview and support*

Online education courses must first clearly present key information and services to learners and stakeholders. It includes eight indicators: the online course covers the course overview and syllabus; clearly states the computer skills and digital literacy that the learner should possess; provides the teacher ' s personal information and contact information for learners and other stakeholders; and introduces the course The materials clearly state the learner's expectations and related policies in an easy-to-understand manner; clearly state the technical requirements of the course and provide ways to obtain these technologies; clarify the grading policy and practice, and are consistent with the course content objectives; provide course technical support Detailed descriptions or related links; provide learners with training before the course officially begins.

### *4.2.2    Course content*

Online courses need to meet national or state content standards, and need to provide learners with a variety of content options to promote their mastery of course content.

Specifically, the online course content standards include the following ten indicators: clearly showing measurable course goals or ability indicators; the course expectations are consistent with the course goals or ability indicators; digital literacy and communication skills are an important part of the course content; supplementary learning resources and related teaching materials can be used to support and enrich the learning experience, which needs to be consistent with the teaching content; course content and supporting materials respect multiculturalism and avoid prejudice; Ensure that the content of course materials (such as textbooks, original documents, open educational resources) is accurate and timely; the course does not contain adult content and avoid advertisements; the copyright and license of any third-party content must be properly cited and marked with an obvious mark; for teachers, they need provide relevant course documents and supporting materials to support and promote effective online courses.

### 4.2.3    Teaching design

Online courses include teaching-related materials, activities, resources, and evaluations. They need to be consistent with the course standards, encourage all learners to participate, and support learners to achieve academic goals. For example, the curriculum structure design should include activities that guide learners to promote self-directed learning and self-monitoring, organize units and courses in a logical order, and course teaching materials and resources should be presented in an effective, appropriate, and participatory manner, and the design should include within one week of the start of the course Introductory coursework or activities; course content and activities should promote the achievement of established learning goals or abilities; course content should be suitable for the reading level of target learners; teaching strategies should focus on interactive design and provide guidance and guidance for students, students and students Interaction opportunities and interaction opportunities for regular feedback of learners' progress. Courses should provide diversified learning paths based on learners' needs and encourage deep participation of learners.

### 4.2.4    Learner evaluation

Evaluation is an important part of online courses. The evaluation of learners can not only measure the mastery of the course content, but also provide feedback to the learners in a timely manner. First, learner evaluation needs to be consistent with the objectives or abilities of the course, unit, or class, and effective course evaluation

methods are used to measure student performance. Secondly, use diverse evaluation strategies to feed back information to students in time to provide opportunities for learners' self-monitoring and reflective learning; in addition, multiple types of evaluation resources and materials are required to provide flexible evaluation methods for learner evaluation; Finally, a clear and clear standard scale needs to be developed to provide specific descriptive standards for the learners' goals and abilities achieved at different stages.

### 4.2.5    Accessibility and availability

The design of online courses needs to pay attention to the availability and usability of courses. Accessibility means that all learners can freely access the content and activities of all courses; usability means that all learners can easily interact with the components of the course. And all learners have access to the same information (e.g. online course materials, activities, and evaluations) and can interact with each other at the same time. The online course standard contains five indicators: the navigation system should be based on the learner experience, be consistent in design and easy to operate; easy to read; provide easy-to-access course materials and activities to meet the needs of different learners; course multimedia is easy to use; The technology required for the course requires the supplier to provide an accessible statement.

### 4.2.6    Technology

Technical support can realize the normal operation of online courses and promote active learning. Technical standards also consist of five indicators: technical tools follow local, state, and national laws and policies to maintain and guarantee learners ' data privacy and information security; online course tools support the ability to learn goals; online courses can provide teachers with more This kind of technical support meets the diverse needs of learners; allows teachers to control the educational content; necessary functions are available to facilitate teachers to record, evaluate, and calculate the exams scores or achievements.

### 4.2.7    Course evaluation

Online courses should be evaluated regularly by various methods, and the evaluation results are used for the purpose of improving the quality of courses. This is a

comprehensive and dynamic process. The course should not only ensure the update of the content, but also apply the latest research results on course design and technology. Course evaluation criteria include:

1) **Evaluate the effectiveness of the course.** Course evaluation methods should be diverse, flexible, and effective, using multiple methods including learner completion rate, satisfaction survey after the courses, teacher or partners feedback, learners, teachers, course content experts, Instructional designers participated in the evaluation of the effectiveness of the curriculum.

2) **Course updating.** Regularly review and update online courses to ensure that the quality, completeness, content and evaluation of the courses are not lagging behind. The period and level of course updates should be incorporated into the course provider's policy.

3) **Effectiveness of courses.** Continuously improve and update the course based on the results of the course review to increase the effectiveness of the course.

## 4.3    National Standards for Quality Online Teaching

Online education teachers are undoubtedly one of the key factors that determine the quality of online education and the success of learners. In a virtual environment, teachers mainly assume the roles and responsibilities of education, social, management and technology. With the change of education, the role that teacher plays changes as well. This trend is fully reflected in the newly revised online education teaching standard-the standard contains eight major standards and 51 small indicators, paying particular attention to the key aspects of teachers promoting learner participation and communication between teachers and students Role.

### 4.3.1    *Professional responsibility*

Teachers of online education should have professional responsibilities that closely follow the best practices of online teaching, including nine indicators: meet the professional teaching standards in the field of teaching or have relevant certificates; become reflective practitioners; constantly pursue relevant online learning and teaching Knowledge and skills; as an ambassador for transferring knowledge to stakeholders; understanding the role of online learning in helping learners become global citizens; possessing effective time management strategies; being a model citizen of digital citizens; and accurately storing in an appropriate form Relevant information and

communication records; able to  explain their responsibilities in relation to  local or national laws related to accessibility.

### 4.3.2    *Digital teaching and community building*

These two standards reflect the knowledge and ability required for online education teachers to promote teacher presence, social presence, and learner presence to support learning through digital teaching. Among them, the digital teaching standard puts forward five requirements for teachers, namely: the use of digital teaching tools for beeter communication and collaboration, demonstration, and interaction; combining the technology, tools and resources of specific disciplines Meet the needs of personalized learning; use different types of tools to realize the interaction of online courses, cultivate relationships between learners, encourage interaction between learners, monitor and motivate learners to participate; have basic troubleshooting capabilities and be able to deal with technical issues in a timely manner ; Provide a secure digital learning space for all  learners, such as data ownership and privacy expectations, digital identity management, etc. "Community construction" emphasizes that teachers use  teaching strategies and technologies to promote the interactive communication ability between learners, teachers, and peers. Teachers should provide learners with sufficient social support, and build learner communication and interactive communities on this basis. The standard proposes five indicators for teachers: the use of learner-centered teaching strategies and current practices, the use of technology to promote collaboration between learners; the expectations and requirements for learner interaction, including the development of network etiquette specifications , Behavior demonstration and implementation requirements; provide interactive opportunities conducive to active learning, build communities among multicultural learners; promote online student-group interactions, promote cooperation and improve higher-level thinking skills, such as analysis and synthesis or assessment.

### 4.3.3    *Learner participation*

Online education teachers promote learner success through interaction with learners or other stakeholders and meaningful participation of learners in learning activities, specifically covering seven indicators: the ability to use digital tools to identify learner participation and performance data patterns, for Promote learners' personal growth and provide improved information; stimulate students' initiative; adopt teaching schedules

suitable for learners, or adopt teaching schedules consistent with learners' personal goals, learning trajectories, and interests; use various technologies in a timely manner Encourage the establishment of communication links; use various technologies to help learners master content through teaching and quality feedback; ensure that learners have the necessary course resources and the information needed to operate the learning platform; often communicate with stakeholders on learner progress and Support learner participation in strategic communication.

### 4.3.4 Digital citizen

Online education teachers demonstrate, guide and encourage legal, ethical and safe behaviors related to the use of technology and are composed of four indicators: providing students with a learning experience that fosters and promotes digital citizenship; establishing codes of conduct for learners to ensure academics Integrity and reasonable use of the Internet; demonstrate and abide by intellectual property policies and principles of fair use, and require learners to practice; observe and implement federal, state, and project level policies to protect classroom learners, and comply with project and classroom Acceptable use policy.

### 4.3.5 Diversified teaching

Online education teachers conduct individualized teaching according to the different academic, social and emotional needs of learners. This section includes seven indicators: where applicable, teachers and support staff monitor and explain the progress of learners, provide reasonable additional support to all learners, and give more attention to learners with disabilities or groups in need; Specific coordination, improvement, or needs to communicate and cooperate with school staff to meet the needs of learners; use data, both quantitative and qualitative, to identify learners who need additional support services; create alternative forms of course materials to meet different learners Provide alternative options; recommend suitable assisted technologies to meet learners ' needs and preferences; provide additional opportunities for personalized learners ' growth or progress; support and provide forum platforms to share learners' talents and skills.

### *4.3.6 Evaluation and measurement*

In an online learning environment, online education teachers create and implement evaluations in an effective and reliable manner and process. Teachers measure learners' progress through evaluations, projects, and assignments to achieve standards-based learning goals. At the same time, they assess how well the learners understand how these evaluations measure the achievement of learning goals. It includes eight indicators: choose appropriate evaluation tools to give students the opportunity to display the content they master; use teaching and content knowledge to develop and implement evaluations in an effective and reliable way and process; use strategies to ensure learners' academic integrity and learning The evaluation of the safety of data; various evaluation methods are used to accurately measure the learner's ability level; the learner's preparation and learning progress are evaluated through formative evaluation, summative evaluation and learner feedback; to ensure homework, evaluation and standards-based learning Consistency between goals; based on learner performance, evaluation data, and learner needs, provide learners with personalized learning experiences; create opportunities for learner self-evaluation in the curriculum.

### *4.3.7 Teaching design*

Online education teachers plan and develop teaching materials, tools, strategies and resources to attract learners and ensure the achievement of academic goals. Applicable indicators for online education teachers' instructional design capabilities include six: the use of technical design to effectively promote learner participation in learning experiences; the use of formative methods to design courses; the integration of multiple media into online learning modules; the integration of digital learning resources in specific disciplines Integrate into online learning modules; constantly review and adjust course content to meet course objectives and standards; create, select, and organize appropriate assignments and assessments to associate course content with standards-based learning objectives.

## 4.4 Ways to improve the quality of K12 online education

As an internationally recognized leader in online education evaluation, QM online education quality evaluation standard has always been its core competitiveness. There is no doubt that the design of the national standard for K-12 online education quality also follows the core concept of QM, how to effectively improve the quality of online

education through evaluation, and highlights the systematical, flexible and operable in the organizational structure of the standard design.

First of all, the newly revised *National Standards for Online Education Project Quality* covers three major areas of online education projects, courses and teaching. It is divided into 29 major standards and 168 specific indicators. From institutions, courses and The four dimensions of teaching, support system and project evaluation provide macro guidance for the core quality of online education projects.

Secondly, the design of the K-12 online education quality national standard emphasizes the flexibility of major standards and subdivision indicators, and strives to meet the requirements of different online education projects opened by schools, regions, and states.Vertically, strive to meet the requirements of different online education programs opened by schools, regions, and states. Horizontally, ensure that it can be applied to different types of subject courses or teaching.

Finally, online education quality standards have strong operability. The new standard does not continue to use the original scoring scale, and the goal is not only to score online education quality. Instead, it integrates high-quality online education projects, courses and indicators through " standard dimensions-specific evaluation indicators-indicator interpretation-indicator examples. The standards that the teaching should meet are clearly presented to the users. People who evaluate can make their own judgments based on detailed and specific explanations and examples under each indicator, whether online education projects, courses or teaching meet high-quality standards.

Meanwhile teachers should provide diversified evaluation strategies for learners in online courses, and encourage learners to carry out self-monitoring and reflective learning. The indicator interpretation section further explains the content of reflective learning, that is, the degree of focus on meeting curriculum requirements and learning goals. The indicator example section provides specific evaluation strategies for standard users, indicating which types of evaluation strategies are more conducive to promoting learners' reflective learning. The systematic, complete and operational standard design can not only provide reference for designers and people who evaluate  online education projects and courses, but also help subject teachers using the standard to more systematically understand the concepts and concepts of online education courses and instructional design. At the core, we will have a deeper understanding of what forms of online courses and teaching meet the quality standards, and will be integrated in the implementation.

With the framework, we can revise the Table 4.1 as below (Table 4.2)

4.2  Newly Revised Framework of K12 Online Evaluation

| | INDICATORS | SCORES |
| --- | --- | --- |

| | Institutional standards | | |
|---|---|---|---|
| Project Quality Standards | Curriculum standards | | |
| | Support standards | | |
| | Evaluation criteria | | |
| Course Quality Standards | Course overview and support | | |
| | Course content design | | |
| | Learner evaluation | | |
| | Accessibility and availability | | |
| | Technology | | |
| | Course evaluation | | |
| Educational Quality Standards | Professional responsibility | | |
| | Digital Pedagogy | | |
| | Learner participation | | |
| | Digital citizen | | |
| | Diversified teaching | | |
| | Evaluation and measurement | | |
| | Teaching design | | |

## 4.5    Possible deficiencies

Although the newly revised national standard for K-12 online education quality is based on the theoretical research and best practices of online education, and provides a strict standard framework for effectively evaluating the quality of online education, the new standard does not emphasize the data of learners in online education. The importance of privacy protection has not raised any relevant standards and requirements from the perspective of online education projects.

In fact, in recent years, with the rapid development of K-12 online education and the accumulation of large amounts of educational data, the protection and safety of learner data privacy has received widespread attention. Generally, schools or school districts that set up online education programs are responsible for collecting relevant data of learners and selecting suitable online education resource providers. The data providers are in a dominant position, and they are not responsible for privacy-related laws, systems or issues. Fully understand, it is difficult to defend their rights. Therefore, the focus of data privacy protection for learners should actually be implemented on the responsibilities and obligations of data users. Schools or school districts that set up online education programs should pay attention to the safety of the collection, storage

and use of learner data, and choose online education services. Suppliers should avoid institutions that may misuse learner information.

# 5    RESEARCH FINDINGS

As discussed in chapter 4, the learning experience and learning output are the two part which are still not clearly achieved and very difficult to evaluate the quality.

In order to study the experience, opinions about online education, and the output of the distance learning. We decided to use a quantitative method to do the research, through a questionnaire survey. We contacted Mr.Yan, the teacher who has taught in East-West Lake District in Wuhan for more than ten years, and asked him for help. Fortunately, he agreed to help us send the questionnaire to his students via WeChat9. Since Mr.Yan has very amplified teaching experience that his students involves not only pupils but also middle school students, and majority of them still in contact with Mr.Yan. Thanks to the kind teacher, we finally received 218 copies from elementary or middle school students and 106 copies from their parents, due to some questions were designed for parents. It was a survey mainly focused on satisfaction, output of distance learning and learning experience ( detailed questions see Appendix 1). Based on the data, we did an analysis. The following findings were obtained as below:

## 5.1    Main findings of satisfaction survey

Students fully affirm the effect of this online teaching, and look forward to adopting a mixed teaching mode combining online and offline in the future.

181 students think that online teaching is better than or equivalent to face-to-face teaching, and 186 students think that the effect of teaching in school is higher than expected or equivalent. 190 the students hope to use a combination of online and offline teaching methods after the epidemic, of which less than half of students want to be mainly offline and 76 students want to be mainly online. Only less than 15 students hope to use offline teaching in the future.

The main positive factors that promote the quality of this online teaching are online technology platform, course content organization, and course content presentation. It shows the better instructions of online technology platform and the content of the course both played a very important role in distance learning. Both of them are indispensable. However, online teaching restricts classmate communication, and the interaction between students and teachers, which is the most important negative factor that hinders the effect of online teaching. And its negative impact far exceeds the second and third factors: course self-learning and concentration during the classes.

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9 The application like WhatsApp

## 5.2     Different of Learning Methods

During the epidemic, the top three public service platforms that used by primary and secondary school teachers are the national educational resources public service platform, provincial education cloud service platform and school-based resource library. The result shows that national and provincial education resource public service platforms have played the role of main channels. In addition, some non-profit education resources also account for a certain proportion, but regional education resources , which only used by 52 students according to the survey, account for a relatively small proportion.

During the epidemic, 24 parents indicated that they have been accompanying all along with their children and 30 parents said they often accompanied children online learning. 40 parents believed that they were accompanied occasionally, and 8 parents said that they were not accompanied at all. Parent-assisted children's online learning accounted for the first three items are online learning supervision reminder which we received 81 positive answer, while 52 parents help children download and upload homework or some other learning materials. Nearly 48 parents help children login to the learning platform, and they were nearly all the parents of pupils, few of middle school students.

## 5.3     Online learning content

In terms of students' online learning content, Chinese, mathematics, and foreign languages dominate, over 200 students have all of the three courses. Other courses such as physics, chemistry, biology, geography and other subjects account less important, which only 26 students have these courses as alternative classes. It is worth noting that schools are more aware of mental health education which 133 students have courses related with mental health. Meanwhile, the same situation in physical education which more than 110 students have gym classes. There is no strange due to the special period when mental and physical health plays a more important role than ever.

Additionally, 92 students have music and arts courses, which shows that art education is also not small proportion. There are also many schools that conduct safety education, science education, life education and responsibility education through interdisciplinary theme exploration and project research. It can be seen that under the epidemic, students have more online learning content, but online learning courses are not balanced, and some non-main courses take up a relatively small amount.

## 5.4 Online teaching issues

In terms of the difficulties and problems faced by online learning, 42 parents think that inadequate teacher-student interaction is a barrier. 40 parents think it is very difficulty in judging the students' understanding. While 37 parents the assignments, acceptance and evaluation are not ideal.

As far as students are concerned, it is mainly reflected in the difficulties and problems encountered in the online learning process. The top three are the impact of online learning on vision which got support from 162 students. Then 128 students agree that it has impact on the learning when taking online courses. And 103 students said there was nearly no interaction during the online classes which might have negative impact on their study.

As far as parents are concerned, it is mainly reflected in the concerns of their children's online learning process. 80 are worried about their children's vision. 62 parents worried about children's addiction to the Internet. and 45 parents worried about the lack of effective supervision.

It can be seen that the difficulties and problems faced by online teaching during the epidemic have different starting points for teachers, students and parents. Therefore, they all have their own different views. However, inadequate teacher-student interaction and online teaching affect students' eyesight are the difficulties and problems that they are all concerned about.

## 5.5 Online teaching effect

When it comes to the evaluation of the learning, 148 students said that their teachers used online homework submission. 82 students used online quiz, and 78 students once used online questions.

It can be seen that during the epidemic, most teachers still use traditional evaluation methods to evaluate the effects of online teaching, only shifted the offline test to the online. However, apparently that there is a lack of evaluation between teachers and students. Additionally, the evaluation method is relatively simple, and there is a lack of evaluation on the contribution of online learning and the utilization of online learning resources.

There is also a direct and important relationship between students' satisfaction with the effect of online teaching and their learning attitude. In terms of online learning attitudes, students with a very fond attitude accounted for 23 of the total sample, and preferred students accounted for 117 of the total sample. 62 of students disliked online

courses, while only 5 disliked. In terms of online learning satisfaction, 31 and 109 students indicated that they were very satisfied or relatively satisfied, 42 students indicated that they were average, and 16 and 7 students indicated that they were not very satisfied or very dissatisfied.

The evaluation of parents on the effect of online teaching is mainly reflected in the adaptability and concentration of children's online learning. 60 parents said that their children had basically adapted to online learning during the epidemic, and they were able to acquire knowledge through online learning. 12 parents thought their children were fully adapted to online learning, 30 parents thought their children were not well adapted to online learning, and 4 parents believe that their children are totally unfit for online learning. In terms of online learning concentration, 15 parents indicated that their children were very focused during online learning and would listen carefully and take notes, etc.; 62 parents said that their children were more focused during the learning process, and 28 parents said The children are not very focused in the learning process. 2 parents said that the children were very unfocused and could not concentrate on listening to the class at all that they believed online teaching had no effect. In addition, parents believe that the top three factors affecting children's online learning are student self-control, family learning atmosphere, and whether learning resources are interesting.

It can be seen that the evaluation of online teaching effects has different focus from teachers, students and parents. But it is worth noting that during the epidemic, most teachers still use traditional methods to evaluate the effect of online teaching, and most students have a positive attitude and high satisfaction with online teaching. Most parents believe that their children have a positive attitude towards online learning and can adapt. More than 70% of parents said their children can concentrate during the online learning process.

## 5.6    Add online teaching content after the epidemic

Regarding whether support to increase the content of online teaching after the epidemic, 24 and 55 parents expressed strong support or relatively support. 21 parents did not approve, and only 4 parents expressed strong disapproval.

In terms of whether support online learning for post-epidemic, 55 and 103 students said they strongly agreed or relatively support. 37 students did not agree, and only 12 students said that they strongly disagreed.

It can be seen that online teaching is not limited by time and place, can obtain high-quality teaching resources, and can be watched repeatedly. It is one of the future development trends of education and an inevitable result of education informatization. There are also shortcomings in online teaching that rely too much on students' learning

autonomy, require the cooperation of parents, and lack of real-time interaction. In the future development of K12 online education, it needs to be continuously improved to ensure the effect of online learning.

# 6 FUTURE ANALYSIS OF K12 ONLINE EDUCATION

SWOT is an useful strategic instrument to analyze both internal and external influences (Rauch, 2007).Based on the existing  research, this article uses the SWOT analysis method to integrate the internal advantages, disadvantages and external opportunities and threats of the K12 online education industry.

## 6.1 Strengths

Online education has high flexibility and cost performance. Online education is not limited by both space and time anymore in comparison with the offline education. Students can even take the courses which might take place in another continent, or take the classes while they are on the bus. Students can also schedule the timetable by themselves, and customize their circumstances, rather than have no other choice but accept all everything that schools have planned for them.

Due to these characteristics, it largely reduce the opportunity cost. It will also enhance the learning effect of students to a certain extent. By freely choosing after-class time for students to study autonomously, there is too much fragmented time during this Mobile era which we can use to study (Qin, 2017). The utilization of  time will largely be increased.

K12 online education has a leading role in emerging educational content. In recent years, a new content has appeared in the K12 online education industry-children's programming. Children's programming is not like learning how to write code and compiling applications like higher education, but training students' computational thinking and innovative problem-solving skills through courses such as programming game enlightenment and visual graphics programming.

## 6.2 Weaknesses

At present, the development of  K12 online education industry in China is not yet mature. As we discussed in Chapter 4, there still lacks the unified standards of evaluation for the quality of online education. Low entry barriers, insufficient teacher resources, and some other problems still exist and so far do not have very effective solutions. Therefore the educational level of different institutions varies. For example, for the qualifications of foreign teachers in children ' s English education, some large-scale enterprises will develop foreign teacher screening standards and training systems,

and plan and design teaching processes and content. However, the relevant systems of many institutions are not perfect, and many so-called foreign teachers are There are no relevant documents such as TEFL or TESOL for teaching qualifications.

There is a lack of real teaching experience in K12 online education. In traditional education, teachers conduct face-to-face teaching in the form of one-to-one or one-to-many. Students can interact with teachers in a comprehensive manner. Students can ask questions and get answers from teachers in the process of learning. The feedback efficiency is high. In addition, the learning atmosphere of the class classroom is also vital for students' enthusiasm for learning. In K12 online education, students can watch live lessons or record self-learning lessons through the web client. The interaction between teachers and students is limited.

## 6.3     Opportunities

Currently, the K12 students are basically born after 2000. Compared with post-80s and post-90s, their online consumption intentions are stronger, their consumption preferences are more unique, and their personal experience is more important. With the continuous increase of residents' income, people's investment in education is also increasing rapidly.

In the context of the development of educational industry, K12 education market has maintained a trend of rapid expansion in recent years. According to the data from iiMedia, it indicates that proportion that people are willing to consume in education is continuously increasing. At this stage, the post-80s and post-90s groups with higher education levels have become parents. As discussed in Chapter 2, these group of young parent take education into account, and think that higher education certificate will bring a brighter future for their children.

Meanwhile, in recent years, government has been sincerely trying to promote the program of *Internet + education*, new forms of education services will be developed to realize China's education. Move towards higher quality and fairer direction.

Even though there are still many shortcomings in current Chinese education. The emergence of online education can efficiently optimize educational resources and make up for the deficiencies in many classroom facilities, manpower and material resources. It is very effective for China's education to make up for shortcomings and achieve overtaking in the corner of a powerful education country.

## 6.4    Threats

Compared with online education, traditional offline counseling has developed more maturely, and a certain model has been formed at the K12 stage, and people are very familiar with this mode. Thus, the acceptance of K12 offline education, at the early stage is very high, while people are relatively not very interested in online education. The quite similar situation once appeared when China started to use digital currency instead of cash. It is not always that easy for majority of the people to adopt new products.

Meanwhile, face-to-face teaching can have more interactions and teachers sometimes can even recognized whether students really understand according to their expressions, actions, etc. Students can also proposed questions and get the detailed answers in real time. The study atmosphere in the classroom can improve the enthusiasm of learning through the interaction between classmates. However, when education shifted online, these features are strongly weakened. So far, there is no technology is innovated to solve this problem perfectly.

## 6.5    Development trend analysis: SWOT

### 6.5.1    K12 online education will penetrate into third- and fourth-tier cities

Online education started to develop in  the first-tier cities with the most developed economy, culture, and technology. The overall cultural level of people in such cities is relatively high, and the acceptance of emerging things is relatively large. According to iResearch (2017), most of the educational resources are centralized in first-tier or second-tier cities, which also means that the saturation of educational resources in these cities is very high. For these reasons, the educational institutions shifted their business to third-tier and fourth-tier cities, because there is still huge potential for development there.

The small cities have suffered for a long time for lacking high quality teacher resources. The educational resources are relatively less in both quantity and quality than the resource in big cities. In this situation, online education takes advantage of its breakthrough of geographical and resource restrictions through the Internet, which meets the learning needs of this group of people and improves education, resource utilization efficiency. The demand for education and training in third-tier and fourth-tier cities is increasing, and their spending power is also growing rapidly. The expansion of

online education to small cities or rural places will become the industry's development trend.

### 6.5.2    *Reorganization and integration of the K12 online education industry*

Even though the online education has developed for decades of years, however, at this time, oligopolistic enterprises have not yet appeared. Majority of the educational institutions are medium-sized. Therefore, the competency is extremely intensive, and it is even difficult for companies to survive. It is expected that under the gradual maturity of the industry environment in the future, some well-operated enterprises will become industry giants. In such a process, mergers, acquisitions, reorganizations and eliminations among enterprises are indispensable. Just like the food and beverage delivery industry and the bicycle sharing industry that have also suddenly exploded, the cruel market competition will eventually screen out truly excellent companies based on product quality and business strategy.

### 6.5.3    *K12 online education will be further integrated with traditional education models*

From the perspective of long-term development, online education and offline education do not exist in opposition, and online education has advantages over traditional education, but traditional offline education also has advantages that cannot be replaced online. The online education platform is relatively independent of offline teaching.

As mentioned in Chapter 3, the most popular business model is B2C and C2C. However, there is a trend that in recent years, O2O business is developing very rapidly, which indicates that more and more companies realize the importance of mixed online and offline education. Maybe within 10 years, we will see plenty of institutions integrated these two types of education, and it works very well.

## 6.6    Development Strategy

### 6.6.1    Further improve industry standards and related systems

China's online education laws and regulations and industry norms need to be established and perfected urgently. Relevant departments should formulate "Online Education Supervision and Management Measures" as soon as possible, by requiring online education institutions to apply for "Internet Cultural Management License", "Information Network Transmission Audiovisual Program License", and "Internet "Publication License" and other certificates strengthen supervision, combine with other methods to clarify the regulatory agencies and responsibilities of China's online education industry, solve the registration and qualification issues of online educational institutions and online teaching staff, and clarify the online education platform in teacher management and qualification review , Teaching quality, fee refund, fund custody, privacy protection, intellectual property protection and other responsibilities and obligations, actively promote the self-discipline of the online education industry, and give full play to the industry associations in strengthening industry self-discipline, promoting industry development, and safeguarding the legitimate rights and interests of enterprises, etc. Positive effect.

### 6.6.2    Deposit high-quality content and build industry barriers

The high market demand, strong demand attributes, few policy restrictions, and simple and clear profit models make online education highly sought-after, and the influx of entrepreneurs and investments has also mixed the industry. To achieve the goal of standardized evaluation of the K12 online education, the only way to go is to improve product quality and technical content, raise the industry threshold, and build industry barriers. For example, K12 online education company Onion Mathematics, its main products are human-computer interactive online tutoring with K12 mathematics and physics subjects as fun short animation exercises as the main form. It uses high-quality courses, AI-based complete learning closed-loop and unique products Positioning avoids homogeneous competition and embarks on a path of differentiation. Therefore, many enterprises in the industry should think of strategies and think of innovative products which can take the full advantages of online education. Enterprises should also continuously optimize the content of courses, reduce homogenized and low-quality courses, so as to gradually phase out companies with lower levels and improve the overall industry level.

### *6.6.3   Further upgrade the user experience through technological upgrades*

The development of artificial intelligence, Virtual Reality and other technologies will enhance the online education teaching scene experience. Cloud services and big data analysis technologies can bring more personalized learning solutions. Apply a variety of artificial intelligence algorithms and establish scientific analysis models. The visualization of various data generated by students in the learning process (such as class completion rate, class cost, class performance, test data, etc.). Therefore, the continuous development of technology will bring about the upgrade of the software and hardware of the K12 online education industry, which will improve the quality of online education products to a certain extent, thereby creating a better experience for K12 users.

# 7    CONCLUSION

As shown in Figure 4.1. The value that the Internet brings to the K12 education industry is reflected in four aspects: supply chain, efficiency improvement, experience optimization and clear output.

The history of the K12 online education is not long. It is combined with the development of technology and subdivision of education.

Even though it still have a lot of disadvantages, however, it is very clear that the advantages are more than weakness. The main disadvantages are lack of interaction and difficult to evaluate the quality of online education. However, we believe that with the development of technology, the problems will finally be solved perfectly.

The K12 online education market is not mature yet. However it also means there still have a lot of opportunities. It is a market with full potential. It also indicates that more innovate products and more different business models are possible.

With the development, not only the market, but also the evaluation models will be mature. The market and business, regulations are more standard.

According to the survey findings, we can see that generally, students and their parents have positive opinions on the online education. Although many people might not familiar with this type of teaching, however, just like digital currency, we finally use it and enjoy the convenience. Meanwhile, because the younger generation are very open to the new technology, we believe that the future of K12 online education will be even brighter.

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Appendix

Questionnaire

For Primary and Secondary School Students

(1 to 5 points, 5 points are very satisfied, 1 point is very disagreeable)

1) Compared to face-to-face teaching, you prefer online teaching

2) Compared with traditional face-to-face teaching, you prefer it combine some methods of online teaching

3) You prefer the online teaching as the main tool, rather than the traditional methods

4) You want to study completely online

5) You want to study completely offline in traditional mode

6) Which platform does your teacher use when teach online?

7) The teachers used the materials prepared by themselves instead of the national uniform online course materials

8) Teachers and students have good interaction during the course of online teaching

9) The teacher can perceive whether the students understand the knowledge

10) You think there is no inconvenience in completing and submitting the assignment

11) The teacher corrects the homework as before

12) You think your attitude towards learning is very good

13) You really like online lessons and think it's suitable for you

14) You are very satisfied with the online courses that teachers have given

15) What courses do you teach online?

16) You have online courses for physical education

17) You have online courses for mental health education

18) You agree that your school only focus on the course on Maths, Foreign Languages, Science rather than art courses

19) What do you think are the biggest negative effects of online classes on you?

20) How does the teacher evaluate the quality of your study (online questions, online exams, submission of homework after class, parents understand the situation, etc.)

21) Do you think such an evaluation method is effective (yes or not)

>>> For Their Parents:

22) When the child is studying, you are always accompanied with them

23) In what ways do you assist your child with online lessons? (Supervision, download courseware, login system, other)

24)  You think your child adapts to online teaching (1-5)

25) You think that your child can concentrate on online classes (1-5)

26) What do you think are the factors that affect your child's online lessons (child's self-control ability,  whether the course is interesting, learning environment and atmosphere, etc.)

27) 27: Even after the epidemic has passed, you hope to continue to have online courses