

The Development of Open Online Courses in China

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Abstract

In 2023, China leads the world in the number of Open Online Courses (OOC, over 64500) and learners (over 1.88 billion). In this article, we provide a brief review of the development of OOCs in China and outline the current situation of Chinese OOC focusing on learning platforms, course size and structure, and micro-credential courses. We also summarize the development and application of OOC in China focusing on national policy guidance, the organizational structure of OOCs, different modes of OOC development, and the establishment of a standardized quality assurance system. We also discuss the OOC credit recognition, blended learning, and multi-school collaborative teaching. Finally, we consider the future development trend of OOCs in China from the perspective of improving digital teaching literacy of instructors and expanding international exchange and cooperation.

Keywords: China, higher education, open online courses; MOOCs; development stages; blended learning

Introduction

Since 2013, the number of online open courses (OOCs) in China has increased by tens of thousands, while the number of registered users has increased by millions. Over 64,500 OOCs were launched in China since the end of March 2023 (Ministry of Education (MoE), 2023), and the number of OOC learners in China has exceeded 1.88 billion (MoE, 2023), making China the world leader in both the number of OOC and learners. This paper focuses on the development and experience of OOCs in China.

The Chinese Higher Education System

Unlike some western countries, such as the United States and Canada, the Ministry of Education of China (MoE)

is a national department with responsibility for higher education (HE) and the formulation of higher education policies for the whole country. The 34 provincial education departments are responsible for implementing the policies of the Ministry of Education in their respective provinces. Therefore, we emphasize the role of the central government in guiding and supporting the development of OOCs.

There are six types of high education institutions (HEIs) in China: Academic HEIs, Research Institutes, Professional HEIs, Vocational HEIs, Adult HEIs (eg: National Open University), and Other Non-government HEIs. In terms of the organizational management, there are mainly two types of HEIs in China: One is funded and managed by Central Ministries, with a total of 433 HEIs; the other is funded and managed by Agencies or Local Authority, with a total of 2,630 HEIs (MoE, 2022a). The number of students in these HEIs exceeds 55 million (MoE, 2022b).

The large HE system has strongly influenced the development of China's OOCs. At present, the vast majority of OOCs in China are provided by HEIs, while a very small number of OOCs are provided by enterprises. In addition, statistics from multiple OOC platforms in China reveal that more than 70% of OOCs learners are current students (Yuan et al., 2019). Especially during the pandemic, all teaching activities have been changed to online teaching, in which OOCs have played a central role.

Four Growth Stages of OOC in China

The growth of OOCs in China can be divided into four stages. Stage 1 began in 2003 and ended in 2010, Stage 2 began in 2011 and ended in 2016, Stage 3 began in 2013 and is ongoing, while Stage 4 began in 2019 and is ongoing (see Table 1). These stages reflect the evolution of OOC development in China from centralized and small-scale to divergent and large-scale, along with the interactive impact of the growth of global online courses on OOC development in China. In Stage 1, the growth of OOC in China came at the same time as the rise of the international Open Educational Resources (OER) movement (Kanwar et al., 2010). In April 2001, MIT officially launched the OpenCourseWare (OCW) project, announcing that the university's courseware would be freely accessible through the Internet, heralding the start of the OER movement. The openness and sharing advocated by the OER movement also provided a reference for the development of OOCs in Chinese universities. At this stage, Chinese OOCs were characterized by the open sharing of static course resources. Course teams were only required to provide text-based resources such as syllabi, teaching plans, and course exercises. There was virtually no interactive activities in the teaching process. As such, in Stage 1, OOC primarily targeted teachers and students in HE rather than the general public. A key role of OOC development was to provide new teachers with the ability to quickly start courses in their schools while relying on existing resources, thereby reducing the workload of course preparation.

During Stage 2, the development of OOCs in China focused on attracting teachers and students in higher education along with the general public, while targeting improving the utilization of course resources. As such, Stage 2 OOCs covered basic and professional courses in higher education, along with popular science and other courses of interest to the general public. In terms of online learning activities design, OOCs adopted forums, homework assessment, and other teaching activities supporting teacher-student and student-student interaction, thus intensifying the involvement of learners. Adhering to the concept of fully open development, the Chinese government invested CNY 38 million into the development of a unified course sharing platform between 2011 and 2013 to drive the sharing of courses. The utilization of OOCs increased significantly during this period.

In 2012, internationally renowned institutions such as Stanford University started launching Massive Open Online Courses (MOOCs). With the establishment of major MOOC platforms such as Udacity, Coursera, and edX, a boom period for MOOC began (Pappano, 2012). In Stage 3, MOOCs became also the typical form of OOC in China. Many independent MOOC platforms emerged, such as iCourse163, XuetaoX, and CNMOOC (Tian & Xia, 2017). As of the end of February 2022, the number of MOOCs launched in China exceeded 50,000, with nearly 800 million course-takers, and rapid growth showed no signs of slowing down.

In terms of course design, when compared with Stages 1 and 2, MOOCs emphasized the creation of a complete online self-learning experience. In addition to providing course materials such as videos and documents, course teams were also required to design teaching activities that conform to the characteristics of online learning (such as peer assessment and online discussion) to enhance the users' online learning experience and improve the utilization of course resources. At this stage, MOOC utilized the intelligent transformation potential of information technologies. Learning analytics technology allows for the provision of personalized services such as recommending personalized learning resources to learners by logging data such as learner habits and browsing trajectories.

In 2019, the growth of OOCs in China entered Stage 4. On the basis of continued focus on the development of MOOCs, this stage was mainly characterized by two major changes: (1) an emphasis on the development of blended learning courses based on existing high-quality MOOCs, integration of high-quality OOC resources in the classrooms of higher education institutions (HEIs); (2) the application of emerging innovative technologies such as virtual reality and augmented reality to transform offline experiment courses with high experiment material costs and experiment risks into virtual experiment courses, further driving the deep integration of technology, education, and teaching. In 2022, the MoE launched Chinaooc to centralize all OOC platforms across China allowing students to search for OOC offered by any and all providers through a single portal. This approach signifies a gradual shift towards providing a standardized path for the development, operation, and management of future OOCs, and reflects that China has gradually formed an OOC quality assurance system led by standards and regulations.

These stages reflect the development process of OOCs in China on the basis of the gradual maturity of teaching technologies. As seen in Table 1, the technical characteristics, openness, target, and resource types differ in each stage. In terms of technical characteristics, new technologies have been applied to learning platforms across different stages. In terms of openness and target, OOCs have shifted from a semi-open to a fully open model, and expanded from teachers and students in higher education to include the general public. In terms of resource types, OOCs have shifted from providing static course resources to the activities and materials needed for a complete learning process.

Table 1

Comparison of OOC growth stages in China

Stages years	Key Technologies	Openness	Target	Resource Type
Stage 1 2003-2010	Hyperlink technology	Semi-open	Teachers and students in HE	Syllabi, teaching plans, learning exercises, experiment guidance, references, etc.
Stage 2 2011-2016	Network technology	Fully open	Teachers and students in HE; The public	Comprehensive course materials
Stage 3 2013-now	Learning analytics	Fully open	Teachers and students in HE; The public	Online teaching activities and materials
Stage 4 2019-now	Virtual reality, etc.	Fully open	Teachers and students in HE; The public	Online teaching activities and materials

The Basic Situation of OOC in Chiina

The OOC Platforms in China

In Stage 1, China had yet to establish a unified OOC learning platform, and course resources were presented by static pages created by course teams. In Stage 2, the Chinese government established a unified OOC platform to provide courses in a centralized manner. In Stage 3, the number of platforms has increased and the types of platforms have become more diversified. At present, there are 37 OOC learning platforms in China, with the most influential being iCourse, XuetaangX, and Treenity. These platforms cover all undergraduate disciplines and majors, similar to edX and Coursera. There are also OOC learning platforms that focus on particular disciplines. For example, the PMPHMOOC platform mainly provides medical courses. In Stage 4, the Chinese government launched the unified Chinaooc platform, which aims to gather and integrate existing courses across various platforms and provide learners with a unified online portal.

In terms of open international cooperation, in order to provide course resources to students and teachers affected by the COVID-19 pandemic around the world, iCourse and XuetaangX both launched international platforms in April 2020.

The iCourse international platform currently offers 351 online courses covering a total of eight fields (including medical studies, engineering technology, ecology and agriculture, economics, electronics, and computer science). The platform has served learners from 156 different countries and regions. Xuetang Global offers 399 courses to other countries worldwide, and has served nearly 10,000 registered learners. The XuetangX platform has also attached great importance to partnering with world renowned universities and organizations, launching more than 100 international courses to enrich platform content and provide students with more choices. The launch of these international platforms reflects China's OOC development philosophy of openness and sharing.

Subject Distribution of OOC in China

In terms of the subjects, as seen in Table 2, the difference between OOCs in China and other countries is that while business enjoys the highest popularity in other countries, the subjects such as management and economics are relatively less popular in China. Social sciences also enjoy higher popularity in other countries compared to China.

Table 2

OOC distribution by subject in China and other countries

Ranking	China	Other Countries
1	Engineering	Business
2	Medicine	Technology
3	Science	Social Sciences
4	Management	Science
5	Economics	Humanities
6	Literature	Education & Teaching
7	Arts	Health & Medicine
8	Education	Engineering
9	Law	Art & Design
10	Agricultural Science	Mathematics

Source: Wang et al., 2022

Micro-credentials based on OOC

Micro-credentials refer to serialized courses on a certain subject provided by MOOC platforms to learners, and are typically made up of 3-10 MOOCs related to the subject. When learners have completed all courses and passed evaluation, they can obtain a micro-credential. The first MOOC micro-credential program in the world was the XSeries program launched by edX in September 2013, which began with Logistics Management and Fundamentals of Computer Science. Soon after, Coursera and Udacity also launched their own micro-credential courses. According to data from Class Central, by the end of 2021, Coursera, edX, and Udacity had launched around 1500 micro-credentials, with over 500 being launched in 2021 alone (Shah,2022).

At present, there are only 21 primary micro-credential courses on MOOCs in China, 3 on XuetangX, and 18 on Treentry. Judging from the design models of MOOC micro-credentials, their career- and skills-oriented features have become increasingly prominent. In terms of course selection, of the 18 micro-credential courses currently offered on Treentry, 5 are related to artificial intelligence and big data, while others focus on core knowledge and skills in a specific professional or field, such as with the Lawyer's Practice Skills course. We can see that the subject selection of micro-credentials has a larger focus on professional skills and modern career development trends. We can also see an emphasis on the introduction of industry partners to strengthen the cooperation between platforms, universities, and enterprises. For example, the "Innovation Project" jointly launched by university professors and industry experts provides well-performing students with internship opportunities to help realize the transfer of knowledge and skills from study to the workplace.

The MoE has placed many regulations and restrictions on the issuance of credentials, posing challenges to the development of micro-credentials. HEIs and society as a whole are also concerned about the quality of online courses, further slowing the adoption and development of such projects in China.

The Development of OOC In China

Government support has been key to the course of OOC development in China over the past 20 years. Academic institutions, provincial and municipal administrative departments, academic non-governmental organizations, and relevant enterprises have also played an important role. In accordance with the OOC development situation of different regions and HEIs in China, different OOC development models have emerged, and OOC quality assurance systems have gradually improved. In this section, we introduce OOC development experience in China from the aspects of guiding policies, organizational structures and their functions, diversified development models, and quality assurance systems.

Promotion and Guidance of OOC Development by National Policies

As shown in Table 3, since 2003, the MoE has issued a series of relevant policy documents that have played a key role in promoting and driving the development of OOC in China. The issuance of the first two policies corresponded to Stage 1 and 2 of OOCs development in China, while the issuance of the latter two policies corresponds to Stage 3 and 4.

Table 3

Relevant OOC policies in China

Effective Period	Document Name	Number of OOC
2003-2010	Notice on Starting the Development of High-Quality Online Courses for Teaching Quality and Reform in Higher Education Institutions (MOE, 2003)	Identified and launched 2744 high-quality OOCs.
2011-2016	Implementation Opinions on the Development of High-Quality Open Online Courses (MOE, 2011)	Identified and launched 3876 high-quality OOCs.
2015-2019	Opinions of the Ministry of Education on Strengthening the Development, Application, and Management of Open Online Courses in Higher Education (MOE, 2015)	Identified 2095 high-quality OOCs. As of the end of 2019, the number of OOCs in China was 12,500.
2019-Present	Implementation Opinions of the Ministry of Education on the Construction of National Excellent University Courses (MOE, 2019)	Identified 3469 high-quality OOCs. As of present, the number of OOCs in China is 61,900.

Source: MoE (2003), MoE (2011), MoE (2015), and MoE (2019).

It should be noted that the issuance of the policy in 2015 was a watershed moment. The previous two policies drove OOC development through top-down selection and approval by the government. Since 2015, the policy has guided the independent development of OOCs by schools, enterprises, and regional organizations, emphasizing the practical effects of OOC applications. The government uses selection and identification as a means to highlight application orientations.

Organizational Structures of OOC Development

Before 2015, OOC development in China was led by the government, with HEIs organizing teachers to carry out course development in accordance with the requirements of policies. During this period, the teaching management departments of HEIs were responsible for overall management, while audiovisual education centers or education technology centers provided technical support. Compared with the number of courses offered by HEIs, there were not many OOCs offered during this period.

In 2013, as Chinese HEIs began the development of MOOCs, most continued the original development model led by teaching management departments and supported by relevant education technology departments. With the maturity of MOOCs, new organizational structures have emerged. For example, Peking University established a MOOC working group

to collaborate across departments, and Tsinghua University established an online education research center to comprehensively drive the development of MOOCs with a new organizational structure. These organizational structures reflect different orientations and concepts of OOC development. Peking University has given full play to interdepartmental collaboration, further integrated OOC development with traditional teaching, and regards OOCs as a key component of its teaching system. Tsinghua University regards OOC development as a key component of its strategic development, and has created the XuetaoX MOOC platform. A survey of Chinese MOOC development and its institutional environment found that Chinese HEIs were more concerned with the challenges and opportunities that MOOCs posed to the reform and development of higher education, rather than their possible economic benefits (Zhao, Zhu, & Wu, 2019).

An alliance-driven organizational structure has also emerged in Chinese OOC development. As shown in Table 4, academic alliances have played a key role in uniting universities to realize the joint development, reform, and innovation of online teaching.

Table 4

Types of OOC alliances in China

Alliance Type	Basic Information	Influence and Contributions
National Alliances	Generally, rely on national OOC platforms, such as the University Open Online Courses (UOOC) alliance	Driving the open and shared application of courses (China wide?)
Regional Alliances	Established with provincial and municipal education departments as the core, such as the Fujian Open Online Courses Education Alliance (FOOC)	Driving the open and shared application of courses in the region
Professional Alliances	Established with discipline-specific professional steering committees as the core, such as the CMOOC alliance	Driving the development of core courses for disciplines, and improving the quality of talent training

OOC Development Models

The first model is to develop new courses oriented around teachers. This is the mainstream model of OOC development in China. The general process of course development is: teachers submit a course development application to the school → the school organizes experts to determine which applications to approve, then provides financial and technical support → the course team completes course development within half a year → the course is launched on an open platform.

The second model is that student teaching assistants use existing course resources (generally those developed in Stage 1.0 and 2.0 of OOC development) for transformation and development. This has created a project-oriented approach for the transformation of course resources. It includes the formation of a student teaching assistant team which, on the basis of a full understanding of course content, organizes the segmentation of knowledge points, video editing, support exercises, support texts, and more for the final review of the lecturer. In 2017, Peking University completed the development of 13 OOCs through this model, proving the effectiveness of a project-oriented approach in improving work results and efficiency while lowering the workload of teachers.

Though the subjects of these OOC development models are different, teachers still need to play an important role. From a more micro point of view on the production of course resources, teachers in different schools have different levels of investment. The primary difference lies in whether teachers need to create their own course videos. This practice reflects the difference in understanding of OOC development across different schools. For example, Peking University guides the independent development of courses by teachers, especially with regard to learning video production technology. The primary consideration is that courses may need to be adjusted or optimized during the development process, which would be easier if the teachers would produce the video content themselves. As such, Peking University focuses on arranging the relevant training for teachers engaged in course development. The school trained a total of 500 teachers over a five-year period (2013-2018). Some schools also work with companies to help their teachers produce course videos, thereby reducing

the technical impediments for video production. This method requires relatively higher funding, and generates additional workload and cost whenever video resources need to be updated.

OOO Quality Assurance Systems

The formulation of OOC development standards is key to ensuring the quality of OOC development. The previously outlined national, regional, and professional alliances have issued corresponding course development guidelines, while HEIs are also constantly exploring suitable guidelines in practice. In 2020, the MoE issued the “Guidelines for Development and Application of MOOCs in HEIs (Trial)”, which further outlined the concepts of MOOCs and blended learning courses, and specified requirements for the development of MOOCs, the development of blended learning courses, and the operation of MOOC platforms.

In terms of quality assurance, teacher training and process guidance are key in supporting the development of high-quality OOCs. The former primarily relies on corresponding teacher training activities organized by the teaching development center of HEIs, with a focus on guiding the voluntary development of OOCs by teachers. The latter focuses on providing practical guidance in the OOC development process. Since 2013, Peking University has provided its course team with course designers and teaching experts at the start of course development. Over the course development process, these course designers and experts provide assistance to teachers in areas such as teaching design, media expression, and project management.

The Application of OOC in HE in China

Driving the development of OOCs through strengthening the application of OOCs is the principle and clearest characteristic of the OOC development process in China. HEIs also use the development and application of OOCs as a key means of education reform and innovation in education and teaching systems, and to further drive the recognition of OOC credits and blended learning based on OOC.

OOO Credit Recognition

OOO credit recognition is a direct method of applying OOC to higher education. At the beginning of 2022, the MoE and four other departments issued the “Several Opinions on Strengthening the Teaching Management of OOCs in HEIs” (MoE et al., 2022), which outlined specific requirements for the teaching management of OOCs used by HEIs to identify credits, including the primary management responsibilities of HEIs, the responsibility of teachers initiating courses, online learning standards and exam discipline, platform supervision and management, and other mechanisms. The policy serves as a systematic summary of the exploration and identification of OOC credits since the launch of MOOCs in 2013. It reflects the top-level design of the government to further drive and ensure the healthy development of online teaching. As of April 2022, the number of Chinese students who have obtained MOOC credits was 330 million, representing 41.2% of all online learners (800 million) (MoE, 2022c).

Both HEIs and OOC platform service providers are actively exploring mechanisms and practical methods of OOC-based credit recognition. At present, a relatively mature mechanism has been gradually formed. Learning platforms are responsible for launching courses, organizing teaching and evaluation, and providing schools with student learning data, while HEIs are responsible for formulating corresponding workflows and specifications. CNMOOC was one of the earliest platforms in China to develop a cross-university credit system. Each calendar year is divided into spring, summer, and autumn semesters, during which work is carried out in the aspects of school OOC selections, student course selections, online learning, online evaluation, and credit transfer. In the early days, courses that participated in credit recognition were mainly OOCs offered by teachers, and were generally complemented by offline exams. With the gradual increase in the number of OOCs, HEIs have gradually begun to allow students to study recognized OOCs and transfer credits during the semester.

Courses that support OOC credit recognition tend to adopt fully independent learning or blended learning. Under the fully independent learning model, students learn online independently, complete all course steps, apply for credits after getting online exam results, then obtain the corresponding credits according to the university’s rules. Under the blended learning model, student learning is composed of online asynchronous learning, phased online/offline synchronous learning, and a final assessment. In this model, the course lecturer and teaching assistants will guide student learning throughout the process. Some schools may also hire their own teachers to provide offline guidance during the synchronous learning and final assessment steps.

Blended Learning

After years of online teaching development and large-scale practice in online teaching during the COVID-19 pandemic, blended learning has gradually become the new normal method of teaching and learning in Chinese universities. Blended learning is primarily based on OOCs developed by the teachers themselves or OOCs developed by other teachers.

The most natural and direct method of blended learning is based on OOCs developed by the teachers themselves. At present, most teachers who offer OOCs provide blended learning on this basis. The basic model is that students learn through OOCs before class, then engage in interactive seminars, research reports, and other activities in offline classrooms during class hours. In practice, blended learning has gradually become a key area of concern in HEI teaching. In recent years, China has also launched national teaching competitions such as the Blended Learning Design Innovation Competition and the National Teaching Innovation Competition (Tsinghua University Center for Faculty Development, 2022). These large-scale competitions have played an important role in furthering blended learning in HEIs.

Carrying out blended learning based on the OOCs developed by other teachers is an important means of driving resource sharing and educational fairness. The basic model is that teachers make use of the course resources provided by other teachers. Students are expected to learn with these resources before class. In offline classes, students are organized to carry out relevant activities to understand and apply the knowledge they have learned online, and are given supplementary explanations of relevant content in accordance with their learning conditions. As such, the MoE has launched the “MOOC Western Tour” plan to help improve the teaching quality of HEIs in Western China through thousands of MOOCs, blended learning based on MOOCs, and “synchronized classrooms”. By 2022, a total of 725 HEIs in Western China have used MOOCs to carry out online or blended learning, accounting for 97.3% HEIs in the region. The plan has provided 172,900 MOOCs and customized course services to HEIs in Western China, helped carry out 3,272,400 blended learning course instances, and reached a total of 376 million students.

Joint Development and Sharing of Online Collaborative Teaching

Over the past few years, China has gradually formed a multi-school and multi-teacher collaboration mechanism for the development of high-quality OOCs in practice, and developed a MOOC-based “1+M+N” multi-school collaborative teaching model. The model uses high-quality MOOCs to lead joint blended learning, drive the joint development and sharing of high-quality resources, bridge the “digital gap” between inter-regional and inter-school education, and effectively improve educational equity.

In the “1+M+N” multi-school collaborative teaching model, the “1” refers to a benchmark and exemplary OOC. These high-quality OOCs are developed by leading teachers from renowned schools, with innovative and quality content. The “M” refers to M small private online courses (SPOCs) launched by different higher education institutions based on “1” MOOC. HEIs introduce high-quality resources and support for both teaching and learning. During this process, institutions will establish a course team to carry out the characteristic and differentiated transformation of MOOC, add localized content, or adjust relevant learning requirements and rules. The “N” refers to N physical classes or N groups of students, and reflects that even when classes use SPOCs with the same content, the corresponding teaching methods can be adjusted in accordance with individual student learning needs and abilities to realize differentiated learning.

The “1+M+N” multi-school collaborative teaching model provides regions and schools with lesser education and teaching resources with the opportunity to develop progressive teaching reforms. In the application of high-quality OOCs, a three-level transition from simple copying to partial transformation to innovative thinking and transformation has been realized, and “1+M+N” has gradually become an OOC application model with Chinese characteristics in practice.

Implications for Future Practice

Over the past 20 years, the acceptance of online learning in Chinese higher education has continued to increase, changing the ways HEIs and students experience education. Looking ahead, it will be necessary to further improve the digital teaching literacy of teachers and the open sharing mechanism of OOCs to drive sustainable development.

Improving Digital Teaching Literacy

No educational reform would be possible without competent teachers. Therefore, many countries are providing teachers with digital technology training programs. For example, several countries launched national digital literacy projects, and established digital literacy portals that provide digital literacy training courses, such as digitalliteracy.gov in US and [SWGfL Digital Literacy](http://swgfl.gov) in UK. Another example is the Institute of Educational Technologies and Teacher Training in

Spain, which provides teachers with various forms of online training and learning experience. As emerging artificial intelligence technologies such as ChatGPT begin to affect higher education, how teachers recognize and understand the relationship between technology and teaching, focus on improving their digital literacy, and adapt their education and teaching methods are keys to the sustainable development of higher education.

Improving the Open Sharing Mechanism of OOCs

With their high degree of openness and accessibility, OOCs have a strong role in driving the circulation of high-quality educational resources. To keep quality standards and supply high, it is necessary to protect the rights and interests of course resource providers by outlining sharing conditions in OOC agreements according to the wishes and needs of different course teams, clearly defining the OOC reference specifications, and other methods. This facilitates the development of an online education ecosystem in which everyone is willing to share and be open.

OOCs are a starting point for driving educational equity across the world. In 2022, China provided hundreds of OOCs in both Mandarin and other languages to all parts of the world. In addition to opening and sharing Chinese educational resources, these efforts have especially improved educational resources in underdeveloped countries. In the future, such sharing of OOCs would expand international exchange and cooperation, bridge the digital education gap, and contribute to global educational equity.

Conclusions

OOC has been widely used in China and has played an important role in higher education reform. The government, schools, enterprises, and social institutions have all contributed to the development of OOC, and it still remains to be seen how OOC will further promote educational reform in China and the world in the future.

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