Teaching Reforming and Exploration at Practical Ability About the Students on Major of Geographical Sciences

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Abstract. Aiming at the three aspects of problems that exist in practice teaching such as more confirmatory contents, less designing contents, etc., this paper pointed out three questions which are not applicable to students in the reform of practice teaching such as emphasizing theory, ignoring practice, etc. Four aspects of practice teaching reform plans are designed and made for it, including changing the concepts of practice teaching reform, adjusting the practice teaching course system and so on. The specific content of practice teaching reform contains seven aspects which can be listed as adjusting the practice teaching content, reforming the practice teaching method, reforming the experimental teaching evaluation methods and so on. After nearly three years of practice, the practice teaching reform has obtained the good construction effects. This reform is mainly aimed at the characteristics of local colleges and universities as well as key majors in Geography, puts forward the ideas of constructing practical teaching system of one goal, two modules, three levels and four combinations, focuses on analyzing the contents of the reform of heuristic and discovery teaching method in the practice teaching. Practices show that the heuristic and discovery teaching method can give full play to students' subjective initiative. It is an effective teaching method of professional knowledge that obeys the law of students' cognition and memory, and it has played a good role in promoting the skills for the innovative talents’ training.

Introduction

Innovation begins with the problems, based on practice. Experimental teaching is an important part of the practice teaching in colleges and universities, to develop students' practical ability, analytical problem-solving ability, the correct way of thinking and rigorous work style plays an important role, it is an important way to cultivate innovative talents. How to improve the experimental teaching quality and effectiveness, cultivating, applied and innovative talents, is a hot spot in the reform of experimental teaching in colleges and universities [1].

To cultivate students’ creative ability of long-term experimental activities, institutionalization, standardization, it is necessary to break the limitations of traditional experimental teaching system and establish innovative experimental teaching system [2]. Cultivation of important visual ability, in order to give students the space of independent
development, so that they get the teaching requirements of experimental teaching content, which consciously develop students' ability to innovation.

The study and learning research on geography theory is the key to improve the learning rate and the actual effect of teaching. Based on this, this paper presents the process of teaching workplace practices, teaching time, teaching content, teaching methods, teacher-student interaction, teaching methods and other practical factors. It focuses on analysis of "inquiry" the important role of teaching method in understanding practice, that play an important role to stimulate the observation of students in the study of typical geographic phenomena. It highlights the correct understanding of the integrity of practice teaching element, indicating exploration and research model, heuristic teaching can give full play to the subjective initiative of students, and is consistent with student cognition, memorizing rules of effective professional knowledge on teaching methods, and play a good role in promoting the culture of innovative talents.

Problems in Practical Teaching

China's higher education exists for a long period, "important theory, light practice" concept, experimental teaching is positioned as an auxiliary means of teaching, just to verify the theory discussed in class through the basic theory; only the basic knowledge and basic skills training, this type of incorrect positioning led to a series of adverse consequences after class [3], the traditional experimental teaching model has the following drawbacks:

1) Experiment content includes, more verification, less designing; multi-unit operation, less comprehensive. Mostly is the verification of the main content, meanwhile, few comprehensive experiments involving the important knowledge points of the whole course are offered [1]. The experiment purpose is set up according to the curriculum, content duplication, dispersed, lack of favorable practical ability of students, comprehensive cultivation of innovative ability, design, and innovative research experiment. In the experimental teaching, there is little encouragement for students to innovation and the development of experimental content. The single validation test is not conducive to arouse students' learning interest and enthusiasm, the ability of student to carry out scientific experiment and independent work in the experimental class did not get effective exercise and improvement, students can not realize the interest of the experiment [4].

2) Teachers often do not take advantage of multimedia technology, but stand directly on the middle of the student or the podium, facing the laboratory equipment to explain. Experimental teaching methods are simple, traditional. Traditional experimental teaching method focus on the procedural training patterns, important knowledge than to train students for designing and analyzing capability which does not give play to the heuristic, exploration of the advantage of teaching methods, students' ability to observe, identify problems, analyze problems, capacity of solving problems, experimental operating capacity has not been fully developed. In the experimental class, less enlightening for students; lack of interaction, classroom atmosphere is not lively enough [1]. This type "force-feed-duck" style of teaching method, cannot give full play to the initiative of students, and tap the potential capacity of students to solve problems, which will suppress the students' awareness of innovation and development intention. In the introduction of the equipment used in the experiment, teachers do not use multimedia technology, and keep standing directly in the middle of the students or on a podium, face to experimental equipment to explain, this type of explanation is not intuitive, teaching effect is not ideal.
(3) Actually, although the current practice of university teaching conditions is improved step by step, most courses can be completed in a university laboratory experiments. But some design experiment and some course design, graduation design is difficult to provide real opportunities for practical training of students, however, after graduation, the majority of students think that there is no need to learn the theory arguing that it’s difficult to adapt to the job requirements [5]. Meanwhile, at present, for most of the school teachers lack experience of working in large-scale enterprises, thus guide students in development project, lack of curriculum design and lack of experience. Practice teaching funds source is single, inadequate investment, practical teaching training objectives is unknown, lack of overall planning lead to practical teaching experience to become a mere formality or by teachers grasp. These are not conducive to the development of teaching work, is not conducive to the cultivation of students' practical abilities.

This practical teaching reform mainly solves the previous practice teaching which is not suitable for cultivation of students in three following problems:

(1) Heavy theory, light practice. For a long time it is based on theory, supplemented by the practical teaching mode, practical teaching has become the verification and supplement of the theoretical teaching, this type of teaching model did not led to serious practical teaching model. Teaching mode problem is that long-standing theory reflects the academic teaching, practice teaching only a part of the theory of teaching, a supplement, resulting in the disconnection between theory and practice, it is not suitable for the current requirements of personnel training.

(2) Based on verification of the main experiment, ignorance of creative experiment. The experimental procedure is usually designed by the teachers, and at first explained, students follow the prescribed order, complete the validation experiments. Dependence of students to teachers, by teachers led by the nose, passive learning, is not conducive to the cultivation of students' innovative thinking ability; through practice to verify the theoretical knowledge of teaching materials, it only consolidates the role of knowledge, ignoring the creation of creative experimentation, it is not conducive to the student practice ability and creative ability. It emphasizes creative experimentation, with attention to cultivate students' innovative ability and practical ability and can really play a fundamental role in the practical teaching.

(3) Only emphasize the theme of the role of teachers, ignoring the initiative role of students. In the traditional practice the teaching process failed to give full play to the subjectivity of students and teachers, the cultivation of the initiative of the student’s ability is not considered. Since there is no role into full play the initiative of students, lack of training of students' ability to work independently, resulting in student dependent and poor experimental capacity. Therefore, in practice teaching should properly handle the "learning" and "teaching" relationship, students should serve as learning a subject in hands-on learning at the guidance of teachers, teachers play a leading role in the practical teaching, students in the "do" in " learning ", in this case they improve the quality of teaching practice, in order to achieve the goal of creating innovative ability of students.

**Practice Teaching Reform Program**

Aim at the characteristics of local institutions and human geography discipline, the authors proposed "a target (talent training objective), two modules (compulsory practice teaching and elective practice teaching), three levels (basic practice, applied practice and innovative
practice), four combination ("combination with meteorological characteristics, reflecting meteorological characteristics," "combination with employment characteristics, broaden the scope of employment", "with combination between professional schools, build shared laboratory", "with combination of brothers institutions, construction of shared practice base") on construction of practical teaching platform thought. Based on this, the practical teaching reform program has been proposed and includes the four following aspects:

**Changing of Practical Teaching Concept**

1. The traditional concept which considers the teacher as the main leading, changed the teacher to a teacher-led, new practice teaching as the main body of students, when teaching as new concept of practice teaching, innovative education. Full respect to the subject status for students to learn with the practice teaching, cultivation of students self-consciousness ability, guide students to use their brains, active exploration, develop new problems, new knowledge, curiosity and thirst for knowledge, as well as issues initiative, independent thinking spirit of critical questioning attitude.

2. Students use their own hands to solve practical problems and can fully mobilize the enthusiasm of learning, enhance student’s self-confidence, help cultivate the spirit of innovation and comprehensive quality. Science and technology innovation activities develop the students' ability to review literature, capability of collecting data, improve their writing skills of scientific papers, and prepare for the future scientific research activities. The teachers who have guided the graduation thesis have a deep experience, students who participated in science and technology innovation competition are significantly better than the other students in these aspects [6]. Science and technology innovation contest is a multi-pairs, different from the usual independent learning, rarely cooperate with other students to complete a work, so it can enhance the sense of teamwork and improve coordination ability.

**Adjusting Practical Teaching Course System**

The teaching content according to the outline requirements is according to knowledge content and characteristics of the theoretical knowledge module, theory with practice modules, engineering practice module, according to the characteristics of knowledge module, timely adjust teaching methods. Example, for the theatrical knowledge module, the theory is strong, it is difficult to understand, students do not want to listen, do not want to learn, can be used before class so that students advance preview (requires prep notes), have knowledge of emotional understanding of lesson using interactive or discussion approaches to enhance students' awareness of autonomous learning, after class to do the test module to enhance the understanding of the questions bank.

**Reform and Practical Teaching Evaluation System**

Examination reform must consider discipline and the actual situation of the institute requirements for the training objectives of undergraduate talents, from the examination content, form, management and evaluation system and other aspects of system planning, and establish a "knowledge—ability—within the concept of quality education in examination "assessment evaluation system, give full play to the test" baton "guiding role, but not overly prominent assessment” baton "to improve students' ability to use their knowledge, self-learning ability, the ability to analyze and solve problems [7]. Emphasis on process assessment, in the "learning"
among "test", "test" among "learning", the financial test and teaching as a whole, and as a complete teaching process to implement. Avoid loose before the students after the end of a tight and the success or decision "a test to get credit" situation.

**Strengthen the Organization and Management of Practical Teaching**

1. Complete spectrum correlation system, and actively support the teachers to guide students to participate in all levels of academic competitions, use all the logistical support for the participating students achieved good results escort.
2. Focus on practical teaching, training ability, open college with various types of laboratory to encourage students to participate in research training and support to guide students' writing and publishing research papers, application software copyrights, patents, and organize teachers to give special guidance.
3. Encourage and support students to participate in research projects as the basis, declaration of national level, provincial level, university level, students practice all kinds of innovative projects, organize teachers to give them a special guidance in the implementation process of the project schedule, quality, quantity carry out.
4. Positive and practice-related business contact base, hire senior staff as academic mentors, regularly invited to revise their professional plans, classroom teaching and undergraduate thesis, etc. to give guidance to promote the integration of classroom teaching and social needs.

**Content of Practice Teaching Reform**

**Adjustment Practice (Experience) Teaching Content**

Reduce verification experiments, increase research and experimental design based on teaching, especially for high school students, and gradually go to the research and design teaching experiment based. For additional comprehensive design experiments, lists multiple topics, for each topic the teacher do the research and design based teaching experiment. All topics cover not only focus the key of knowledge, but also have some interest, to stimulate students interest. For innovative experiments in comprehensive design an experimental basis, to enable students to use their imagination, using the existing experimental conditions since the proposed topic, after the experimental design teacher approval [1]. For more difficult, courses cannot be completed on the subject, after class the students can use the laboratory and take time to continue the design and experiment.

**Reform of Practice Teaching Methods**

1. For the characteristics of geography, reform of the single traditional teaching model is done, so that the size of the class can be combined one with each other. Geography is a very practical subject, should make full use of the nature of this natural laboratory. Single traditional teaching mode in recent years to gradually break the theory and practice, try to practice teaching throughout the classroom theory teaching. The development of experimental class to geological museum, Fangshan Mountain and other practical base not only enrich the teaching experiment content, but also active classroom atmosphere.
2. Use of heuristic, discussion teaching. In experiment teaching, focusing on mobilizing the enthusiasm of students and initiative to reduce teaching "force-feeding-duck" type of
indoctrination methods, the use of heuristic, inquiry-based teaching methods. For example, in "geology and geomorphology" practice teaching, teachers must first demonstrate the identification of representative samples, and then an independent appraisal by the students, group discussions, team representative to the podium presentation, class discussions, and then by the teacher who explain difficult distinguish similarities, differences and summarize the main points.

Arrange special subject of discussion in class, arranged questions and discussion questions, classroom or in a 10-minute recess organize discussions before the formal teaching. Then continue interaction between teachers and students, to stimulate students to actively thinking, encourage students to doubtful questions and make inquire into difficult problems. The teacher let the students understand the experimental design, as well as pay attention to all the issues raised are not satisfied, and then guide students to discuss, and finally the basic elements of experimental design and basic principles and knowledge of material selection experiments are introduced [8]. Teachers take such open teaching; the students discuss with each other mainly the teacher’s only play a guiding role. Students were profit to ask questions, teachers do not rush to answer, but to study the initiative to the students to enable them to each other in the course of the discussion of their own to find the answer to deepen their knowledge and understanding of experimental design.

(3) Take the teaching mode based on situational problems, emphasizing basic knowledge and basic analysis methods, focusing on ability to cultivate and apply new knowledge, to enhance the training capacity of the practical operation ability [6]. Through theoretical study, experimental measurements, experimental plan design, improvement of the overall quality of students, training and improving the student’s comprehensive quality in the aspect of equipment information and experimental operation instruction,

(4) Implement individualized personalized teaching. Provides to students the independent of learning a second classroom, students are encouraged to leave school and back home to the suburbs geo investigation and write a short essay for classroom discussion and academic exchanges. In comprehensive practice, to focus on cultivating students’ training ability, to strengthen the entire placement process monitoring; according to the actual situation of the student in accordance with their attitude, carry out small research on special topics based on spare capacity to complete the basic requirement on learning, carry out on the basis of the completion of the basic requirements of the order to mobilize the students' initiative.

Reform Experiment on Evaluation Methods

(1) Students examination results with experimental teaching, is no longer simply the last test scores, but through certain methods and means of theoretical knowledge level of the students, learning attitude, practical ability, comprehensive expressive ability and innovation ability to give correct and objective judgment and grasp, the establishment of student test, scores comprehensive assessment method and diversified assessment. The main is: □ class quiz and written examination situation of case combination. □ Student attendance, as well as participating in the experiment enthusiasm and initiative. □ work completion with the experimental result of the performance assessment. □ open-book examination with closed book examination combined. □ a part of experimental content include in the final exam.

(2) Changes of student's evaluation indicator, emphasizing the process of assessment. Student evaluation should focus on process rather than the results of the examination, the
students usually score percentage up (60%), so this become more important for the evaluation of students. The basic theory and knowledge test required internalized into the usual learning process. Process assessment are refined into five modules: course participation (mainly theoretical and experimental class attendance) + classroom interaction + usual test (including mid-term exam) + case test (practice) report completion + finish the after class homework. Each accounts for a certain weight.

Establish Open Laboratory

The implementation of open laboratory management, first can greatly improve the level of shared resources, to satisfy the different disciplines of different majors with multi-level needs; secondly, usage experimental instrument and equipment will also be significantly improved [1]. Since the establishment of our college innovation laboratory, there have been established a very good laboratory equipment a very good laboratory information environment, in addition, to normal laboratory experimental teaching, open around the clock to achieve the experimental time, experimental space, experimental content and experimental environment spot guidance, students can use extracurricular time to do autonomous experiments by associate professors, lecturers, graduate students take turns in independent experiments.

(1) Open experimental content: for experiments in comprehensive pilot project, the students according to their own major, expertise, hobbies, etc., choose from multiple experiments topics. They can not only select the prescribed minimum number of experiments but also the multiple choice. The application of innovative projects, under the guidance of teacher’s literature review, data collection, fill in the application form, after approval of the project to develop the first embodiment, and planned research projects.

(2) Full open of the experimental course: establish open Laboratory, students are encouraged to independently design, students can use the laboratory resources and practices in an open time activities. Such a dominant position as a student, to fully mobilize the students' interest and enthusiasm for research.

Compiled Practical Teaching Materials

Combined curriculum system, strengthening self-build materials experiment, first published by the organization as soon as possible set up a separate experiment course of experimental materials, but also actively carries on the revision work of the experimental teaching material of other courses, this has plans to publish 3-5 books experimental teaching materials with geography class professional characteristics.

Training Comprehensive Practical Quality

(1) Selection courses experimental project, cultivate students "learn by doing" ability. Courses experiment validation, comprehensive and design experiment, depending on the course characteristics and training program requirements, reduce verification experiment, try to increase the comprehensive and design experiment to develop the abilities of students [5]. Students with their own hands "do" in a process of learning, increase interest in learning, or "learning by doing." For example, participating in all kinds of mapping and geographic information in various competitions, including the knowledge of many disciplines, may need to use optimization theory, communications and computer networks, computing theory, the use of relevant software and programming knowledge, as usual limit hours of courses, students in the
hours specified in difficult to master, so you can "learn by doing" approach to develop their interests, so that they "do" in the process of their own to learn, develop their ability to innovate in the "doing" process.

(2) Active carrying out of scientific research project, organizing students to participate in and support different levels of schools, and other provinces and countries, different types of college science and technology competition, such as mathematical modeling, ACM contest, college students and other research project. Further enhance the students' innovative spirit and scientific research ability, practical ability and organization, coordination ability, improve the overall quality of students.

**Establishment of Innovative Practice Base**

(1) Set up practical innovation base; let the students as early as possible into the enterprise. Universities and IT companies to establish a stable practice training base, curriculum design, graduate design can be arranged in these enterprises [5]. Related business practice base arrangements have experienced technical staff guidance, tracking and monitoring school co-management. Meanwhile, practice enterprises to set up training centers in our college, reserve personnel talent for business. Practice base related enterprises have not only practical experience but also sends technical personnel to guide practice teaching, the college sends teachers to practice corporate testing exercise and enhance their practical teaching experience.

(2) Actively promote school-enterprise cooperation, to cultivate student's ability to innovate. To jointly cultivate abilities of students through school-enterprise, teamwork and innovation, professionalism and ability to adapt to society as soon as possible. Construction of innovation base, so that students have room for innovation and research platform to stimulate the students' interest in scientific research and academic innovation, and create a good academic atmosphere. Students participate in academic research contest with enthusiasm, relying on student generated research and innovation base, many times at the provincial race winner. A key scientific research fruits of times out, effectively influence, led the students to pass the baton of innovation.

**Progress in Establishment of Practice Teaching Reform**

In recent years, in order to allow more students to participate in extracurricular training activities, to improve students' practical ability, and to organize schools events participation inside and outside the country, every year is set the university innovation fund and the key laboratory open fund projects. Science and technology altogether participate in extracurricular activities, not only to train and improve students' ability to innovate, but also to train and develop their fighting spirit and team spirit, to create a good, uplifting style of study and academic atmosphere. Meanwhile, guidance on these events, has improved the innovation ability.

Actually, the new situation experimental teaching reform, effectively improving the quality of teaching practice, to stimulate students' interest in learning experiments, better play to their potential, improve their ability to innovate. Currently student enthusiasm is high, the laboratory actively organize teachers, selection of students to participate in extra-curricular science and technology activities or to declare innovative projects. In assessing the previous inspection have been fully affirmed the school teaching supervision of experts and highly praised, won several
awards at national and university experimental teaching reform and innovation projects competition aspects. Mainly in the following aspects:

Table 1. Calendar year postgraduate rate, high quality employment rate (unit:%).

<table>
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<th>Year</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>High quality employment rate</td>
<td>87.5</td>
<td>86.76</td>
<td>93.06</td>
<td>92.13</td>
<td>92.86</td>
<td>91.85</td>
</tr>
<tr>
<td>Postgraduate admission rate</td>
<td>34.52</td>
<td>34.31</td>
<td>28.82</td>
<td>32.02</td>
<td>32.14</td>
<td>32.56</td>
</tr>
</tbody>
</table>

(1) Improve the training quality, to maintain a high employment rate, postgraduate entrance examination rate, has won a good social reputation. Because the foundation is solid the ability is strong, recent graduates generally welcomed by the employers, demand exceed supply. High quality employment rate of undergraduate was above 86% in 2009-2014 period, in 2011 and 2013 the average was more than 92% (see Table 1). Since the four-year the university research has been done by the teachers, some students will soon be able to go out to work or independently be qualified as real responsible for the projects. The Feedback from the employing unit is generally indicated: our college of geography major has entered the work roles fast, strong practical ability, practical serious work and hardworking characteristics.

Solid foundation of knowledge ensures the improvement of postgraduate admission rate. From 2009 to 2014 from Beijing Normal University, Wuhan University, Tongji University, Central South University etc. 985 colleges passed a total of 60 candidates, Nanjing Normal University, Hohai University, China University of Mining etc. 211 colleges passed a total of 120 candidates, the lowest postgraduate admission rate reached 28.82 %. Whereas the highest postgraduate admission rate reached 34.52% (see Table 1).

(2) Scientific research to promote learning activities effectively improved the ability of students to participate in practice, improve the ability of students to solve problems in practice, capability of analyzing problems, and enhanced the students' mental awareness and quality. By reforming the practice teaching, so that students understand the society as soon as possible, into social services, to improve students' ability to adapt and shorten the novitiate students after graduation. Through the investigation on the employing units by province, more than 90% of employers are students with basic knowledge (professional basic knowledge), operational capacity and good adaptability.

Meanwhile, it also to strengthened the relationship between schools and enterprises, to improve school conditions, enhance the vitality of the school, to sole internship of financial constraints, learning site selection constraints, practice time is not guaranteed, learning content is difficult to in-depth, training and many other unsatisfactory problems, improve the quality of teaching, reflecting the higher education for local economic construction services. Through the combination of two kind of education environment, school class and enterprise production, culture and the local economic development "timely, to adapt for, suitable" application-oriented talents.

(3) Establishment of practice teaching base, effectively improve the practice of teaching conditions, to ensure the development and cultivation practice to improve the quality of teaching.
Different levels of high-quality practice of teaching and organic combination of classroom teaching, the students' ability to use the full exercise of knowledge, hands-on ability, and ability to discover problems and solve problems, promote the improvement of the overall quality of students. In particular, it significantly improve students' creative and practical ability. Students in the "Challenge Cup" Jiangsu province college students entrepreneurship program, "Compass Cup" National Youth Science and Technology Innovation Competition, National College of Surveying and Mapping Science and Technology papers, in middle of competition has made remarkable achievement, accumulated national rewards, provincial got more than 60 candidates awarded (see Table 2); declare success each grade more than 20 candidates "College Students Practice Innovation Projects".

<table>
<thead>
<tr>
<th></th>
<th>First prize</th>
<th>Second prize</th>
<th>Third prize</th>
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<tbody>
<tr>
<td>National awards</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Provincial awards</td>
<td>6</td>
<td>26</td>
<td>22</td>
</tr>
</tbody>
</table>

(4) Through practical teaching reform and exploration, has become more standardized, improved teaching practice management system, research and suitable practical teaching program and syllabus for geography class major training and innovative talents in local undergraduate universities and have prepared a geography major class practice innovative features internship guide book.

Conclusions

The study showed that the results have achieved from a single professional education to the comprehensive quality education, from imparting knowledge to cultivating knowledge transfer to ability, independent analysis of the problem, problem-solving ability, change in hands-on ability and innovation ability. Has completed the construction of a significant characteristic of practice teaching base, promote practical teaching from the verification, from simple to comprehensive, from indoctrination to discussion, from the understanding, inheritance to research and innovation to transformation. The performance is in:

(1) In teaching arrangements, the practice teaching system of practice teaching is kept step by step. According to geographic undergraduate training plan, practical teaching system maintains continuity in time, keeps incremental in content, each school year has a different content, purpose, learning requirements, and four years without interruption. Focus on issue of the actual application of seven no links training, guide students to take the initiative on innovation, so that they learn to change conforming to their objective.

(2) Constantly strengthen the learning base construction, and strive to create innovative practical platform for innovation. According to "step by step teaching, regional mutual associations, highlight the principle of innovative method", carefully selected, focus on building a number of practice teaching base, and strive to establish a practical innovation platform for geographical talent. Based on cultivation of innovative training talent, reformed practice teaching enables to carry out research and development, to recruit business instructor,
to strengthen the practice of innovation as the main line in research training, to participate in scientific researches training, in autonomous learning as the core, to participate in the competition, positive self-motivated and innovative talent training model.

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