

Design and Implementation of the Independent Case-Based Teaching System Based on Network Platform

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Abstract

In order to solve the existing problems of case-based teaching, the construction of the independent case-based teaching system is proposed, and the connotation and advantage of independent teaching system are analyzed. With the construction of network teaching platform, case-based teaching process is optimized and function is reorganized through the system layering design and system function module design. The network platform provides support for the construction of the independent case-based teaching system. The independent case-based teaching can promote students' active learning, and it's helpful to improve the abilities of analyzing and solving problems of students.

Keywords: *Case database, Independent teaching system, Network platform, System function*

1. Introduction

Case-based teaching plays an important role in teaching reform in administrative courses. Case-based teaching is the communication bridge between theory and practice. In the course, if there is no case support, it is easy to have the impressions that apply mechanically and echo what the books say.

Case-based teaching is an important means to enrich the classroom and enrich the teaching content. Domestic scholars in this respect have got many research achievements.

There have been quite a few methods on how to carry out case teaching better. In the traditional case teaching, Wang Xu added a "brainstorming" teaching method based on teacher-student interaction [1]. Hu Tao put forward five stages about case teaching: case preparation stage from teachers, students preparation stage, preparation stage of group discussions, focus group discussion stage and summary stage. And he put forward the platform adding community model of practice teaching method [2]; In the network case teaching, Che Jiao discussed the strategies and methods of case teaching based on network, combined with practical experience on educational reform in business administration major of Chang Sha TV university [3]. Li Yaling introduced the implementation of case teaching and case teaching based on the network, and discussed the relationship and difference between them [4]; About the information construction of case teaching, Zhao Yan analyzed the construction of interactive network learning environment, based on existing teaching theories and the study theories. He also analyzed the scope of application of interactive learning environment on case teaching network, combined with the characteristics of case teaching [5]. From the target oriented perspective, Liu Hongyan analyzed the network case teaching reform, combined the target type teaching, case teaching and network platform, and achieved quality-oriented education and innovation education [6]. In the aspect of the construction of case library, Liang Shan explores the construction model of case library of SNS virtual community in the perspective of virtual community [7]. Xu Yongjun pointed out that the construction of

case library should follow the scientific mode of "4S", which refers to organize research team, to construct case library conformed to quality standards through scientific process, and to share achievement[8]; In the aspect of evaluation index system of case teaching, Liu Yanwen combined with principal component analysis and AHP, constructed the evaluation index system of case teaching, and provided a reference for the evaluation of the MBA case teaching [9]; Liu Wen constructed the evaluation index of network case teaching by Delphi method [10]; Zhou Meini constructed the evaluation index system to analyze the construction of case library in colleges and universities [11]. In the aspect of disadvantages of traditional case teaching methods, Feng Yuguang took courses as background, and discussed existing problems of case teaching from three aspects of students' quality, the construction of localization of case and assessment methods of case [12]; Li Yunqing analyzed causes of the problems of case teaching, from the aspects of understanding of case teaching, implementation of case teaching and supporting mechanism of case teaching, and put forward suggestions for the improvement [13]; Wang Xiuzhi believed that the lack of interaction between teachers and students in the case teaching, the confusion of case teaching and exemplification in teaching, and the old-fashioned cases were reasons on poor effect of case teaching [14-18].

Foreign scholars have carried out relevant research in this respect. In order to understand experience of students about transition from lecture mode to case study pedagogy in business management courses, Subhadip R conducted a grounded theory based on the interview of 33 postgraduate students enrolled in a business school in India. The findings provide a systematic analysis of the various issues in incorporating such pedagogic shifts, which may help academicians to successfully troubleshoot any problems associated with commencement of case based teaching in the Indian context [19]. R J constructed an e-portfolio platform for students. In the research a model was designed for identifying the specific learning context and providing the corresponding knowledge support. A system framework which uses advanced information techniques is proposed. Information Retrieval technique extracts and analyzes key concepts from the student's previous e-portfolio records [20]. Some researchers seek to establish the effect of a case-based teaching method on students' confidence in anatomy, and the results show that case-based anatomy instruction can significantly improve students' confidence and knowledge of anatomy. This method of teaching was also highly rated by students, which may make it a viable option for the teaching of anatomy in the modern medical curriculum [21]. Tayem Y aimed to measure medical students' perceptions of incorporating small group case-based learning (CBL) in traditional pharmacology lectures, and the majority of students thought that CBL was an effective learning tool for them and it could improve their learning skills, independent learning skills, analytical skills, and their level of preparation for exams [22].

In summary, there are many researches about case-based teaching, but most of the results are to study the case-based teaching from one aspect or a certain point of view; For example, the majority of these researches are about the influence of case-based teaching on the effect of studying and the application of case-based teaching in the curriculum. Many researchers maintain that the case-based teaching is only a supplementary means of traditional teaching, but the study of the case-based teaching as an independent object and constructing the independent case-based teaching system in the network environment have not been seen.

2. Problems Existing in Case-Based Teaching

Table 1. Problems Existing in Case-Based Teaching

<i>Unsatisfied aspects</i>	<i>Dissatisfaction rate</i>	<i>Students' main demand</i>
Communication process	49.7%	All the students should have the opportunity to express their opinions; All views should be taken seriously, and be given feedback; Classroom discussion should be warm and efficient and should not stackup;
Case materials	35.8%	Do not like lengthy text-based cases, like to analyze various forms and strong politics cases; Do not like the big and empty cases, hope that there is localized cases close to the actual situation; Lack of background knowledge, deeper classroom discussions, hoping to find solutions;
Evaluation system	56.7%	Evaluation system should be open and fair; Considering the weights of students evaluation within the group and between groups;
Case organization	26.2%	There should be a certain autonomy of selecting cases; Discussion group should not have "free rider" phenomenon;

Many scholars and teachers have analyzed the problems in the teaching cases, and there are many research results from different perspectives, but the students as the main body, research about student demands in case-based teaching is still rare. We conducted a questionnaire survey based on 200 students, and these students distributed in four grades of department of economics and management. From the 187 valid questionnaires, the student demands in case-based teaching are summarized in Table 1.

Because of the number restrictions of questionnaire, the survey only reflects a part of the problem in the case-based teaching from the perspective of students. In summary, there are still many problems in the traditional case-based teaching due to the restriction of time, space and other factors. In order to improve the effectiveness of case-based teaching, these problems should be solved.

3. The Connotation and Advantage of Independent Teaching System

3.1. The Connotation of Independent Teaching System

Independent teaching system based on network platform establishes the case database of its own and relatively independent evaluation system, which can promote the students' autonomous learning. The so-called "independent" mainly contains the following contents:

3.1.1 Students' Learning Behavior is Independent of Teachers

"Post 90s" college students have distinctive personality and active thinking, and they don't like stereotypical classroom. With the aid of the network platform, the teachers ask questions and assign task in the classroom. The teachers do monitoring and give evaluation after class. It can give the students more autonomy in learning time, study location, learning style, so students are the dominant position. Teachers can fulfill a leading controlling function in teaching process, inspire the creativity of the students, as well as the interest of study and cultivate integrated ability of solving problem, and promote students' active learning.

3.1.2 The Construction of the Case Base is Independent of Course

We hope to build network-based case database and realize the relatively independent and sharing of outstanding cases, and cases are no longer scattered in the course, but self-contained. It plays the role of service and support to many related courses. The comparatively stable organization should be established by school. The organization shall be responsible for collection, evaluation, analysis of the case, and promote the orderly and long term case production. The teachers select case as needed from the case database, and after reviewing, modifying, rearranging, the classical reviewing, the essence part in the case study are stored in the case database again, so promote a good cycle of case database.

3.1.3 Evaluation and Monitoring System is Independent of Classroom

The traditional classroom assessment and monitoring methods such as attendance, classroom assignments, answering the questions, have been unable to meet the requirement. Under the new environment, we should learn the foregone achievements. The evaluation system of case-based teaching under the network environment includes evaluation of case database construction, tutors guiding, students' active learning and network function, and the evaluation results are published. The teachers give students the rights of mutual evaluation, teachers can set the weight as required, and teachers also can use the web logs to observe student learning behaviors and check learning situations.

3.2 The Advantage of Independent Teaching System

The traditional case-based teaching materials are scattered in the curriculum. The different cases, even the same cases are independent in different classes and different courses. It is difficult to learn from each other and it is difficult to form the system. Even if there is accumulation, it is still personal behavior of little scope, and it is difficult to share and inheritance. Independent case-based teaching system based on network platform can provide resource sharing service by establishing relatively independent case library and evaluation system. Case-based teaching is no longer simply affiliated to course teaching, which creates a system of its own, and there are many advantages compared with the traditional case-based teaching.

3.2.1 It Can Improve the Efficiency of Case-Based Teaching

The preparation, organization, grouping and discussion of case-based teaching is a time-consuming and laborious process, and it will take up precious classroom time. We can use the network platform to complete the case uploading, reading, communication, analysis and summary. Network communication can overcome the fear of students in the classroom to speak to some extent, and it is particularly suitable for complex tasks requiring students to discuss and think for a long time. The key problem unresolved online can be answered in class. It not only improves the efficiency of the classroom, but also can urge students to effectively use the spare time, and improve students' active learning ability.

3.2.2 It Can Share Resources and Reduce the Repeated Construction

At present, the case-based teaching is lack of coordination. Teachers spend a lot of energy to make the cases, but did not realize the sharing of resources. At the same time, it causes the problem of repeated construction. The establishment of case database based on network platform allows resources to be shared, and it can solve the problem of repeated construction.

3.2.3 It Can Enrich the Teaching Material

There are many network videos, audios, animations and other resources which are very good materials in the independent case-based teaching system. If adding those materials to the case database, it will make the teaching process lively and interesting, which can help to stimulate students' interest in the learning.

3.2.4 It Can Increase the Breadth and Depth of Student Participating in Case-Based Teaching

More in-depth exchanges between teachers and students are needed in the case-based teaching, so it is possible to create the new ideas. The exchanges of traditional case-based teaching are limited by time, and the cost is higher after class. Network communication can break through the limit of time and space, and is conducive to expand the breadth and depth of communication.

3.2.5 It Can Help Realize the Accumulation of Advantage

The network platform can record the previous case analysis, the classic discussing problems and the essence of the content through the web log, blog and forum. The content can be later used by teachers and students. With the case being used, it can be more perfect and more in-depth.

4. Network Platform Construction of Case-Based Teaching

The construction of independent case-based teaching system is based on the network platform, and the process design is shown in Figure1. The front-end of the system using JSP, the background using JAVA language, and the architecture of B/S is used. New technologies promote the sharing quality of the case-based teaching resources. The system has the advantages of simple operation, high retrieval speed, and supporting fuzzy search, so it is easy to use. The teaching process includes the preparation stage, implementation stage and consolidation stage.

4.1 Preparation Stage

Preparation stage mainly completes the students grouping and the cases selection. Grouping rules are formulated by teachers, and students are free combination. The choice of case is divided into three forms: the teacher assigned the case, students are free to choose, and students choose teachers approved.

4.2 Implementation Stage

In the implementation stage, the teacher provides case related materials, along with asking questions. This process is respectively formed the personal report, the group report and the final report through independent studying, independent thinking and group discussion. To fulfill the discussion mode teaching, the key is that teachers must successfully play the roles as organizers, instructors and listeners. After the group discussion, teachers make generalizations.

4.3 Consolidation Stage

At this stage, the students have formed a preliminary report under the guidance of teachers through summary, comparison and discussion, then the teacher summed up to form the final report. After the expert reviewing, the case reports are storage in the case library.

4.3.1 Key Techniques

There are two ways of realizing upload and download function. One is to use the download and upload component, and the second way is to transform the uploaded file into a binary stream through the object encapsulation. The second way is used in this system.

Lucene is a framework of an open-source full-text search engine, and provides a complete query engine and index engine, part text analytical engine. Lucene contains two parts: indexing part and searching part. Establishing index process is as follows: Processing the source string using analyzer, which consists of two aspects: word segmentation and the removal of stop words. The valid words in different Field are added into Document, Document is added into index, and the index is finally written into the memory. The searching process is as follows: the searching keywords are provided by users, after the processing of analyzer, then the corresponding document is found, and finally, extracting the Field from the document according to user's requirements.

4.3.2 System Layering Design

Each part has a certain interaction on the function. In the design process, the coupling degree between the modules should be reduced, so that each module can be independently developed, and the system needs to be reasonably classified. In this paper, the whole system is divided into three layers: presentation layer, business logic layer, data access layer.

The presentation layer is mainly used for data display, mainly JSP page. Business logic layer is mainly deal with sending request of the presentation layer, and returns corresponding data. This layer is divided into three parts: Struts layer, Service layer, Dao layer. The main task of Struts layer is to connect the business logic layer and presentation layer, and transmit request of presentation layer and return data of the business logic layer. Service layer is to implement the business logic by calling the Dao layer, which encapsulates the database inserting, deleting, updating, and selecting operations.

It is through the interface to achieve correlation between each layer. This reduces the coupling between layers, and each layer can be developed independently, as long as the external interface can be exposed.

4.3.3 The Design of System Function Module

Case-based teaching system can provide efficient case retrieval. Users can discuss the cases, evaluate the cases and ask questions in the forum, and other users can reply it according to their own understanding.

To sum up, there are at least the following functions in the system. User login: it checks to see if the user has access permission and verify that the parameters are valid. User password change: it ensures security, and the users can modify the password according to their own needs. Case retrieval: it provides a combination query of multi-condition, and the users can quickly find the resources related to the case according to their own needs.

Uploading and downloading of the case: the users can download cases to see the details after retrieval resources and users can also share their own good case. Favorites: the users may need to use some cases frequently, in order to use the case conveniently, and they can put the case into his favorites. The users can effectively communicate with other users by online communication. Case classification management is also needed.

The function module of the system is mainly divided into teaching platform module and case database module. Teaching platform module includes management module and user module. User function module mainly consists of case retrieval, case study, case discussion and analysis, reporting functions. System management module includes

information maintenance, making announcement, case evaluation, teaching module. It is shown as Figure2.

The construction of the case database is the basic content of the case-based teaching, and high quality case materials importantly support and guarantee the teaching effect. The cases stored in network-based database are variety, then the new case can be extracted from the case database through picking and reorganization. In addition, managers can also be the case materials producers. Case materials are varied, which can include video, audio, documentation and other forms. A case database includes not only the case itself, but also contains background information, case questions, case answers, excellent view, outstanding case analysis report and so on. The architecture of case database is as shown in Figure3.

In the above teaching process, teaching thoughts such as student active learning, the teacher assigning task, making requirements, monitoring and giving evaluation are embodied in the independent case-based teaching system. Firstly, considering the current students like diversity, political cases, not like rigid, serious and long case, we should give students more control over the choice of case in this process. Secondly, the system is easily to change the roles of teachers and students. Students are the main emphasizing the students' active learning, teachers play the supporting and monitoring roles, and teachers also play service and administrative roles; Thirdly, the case-based teaching is constructed as an independent course system, and the case can be embedded in a certain course, which can also take out many relevant cases out to study independently, so it can play the support role to related courses.

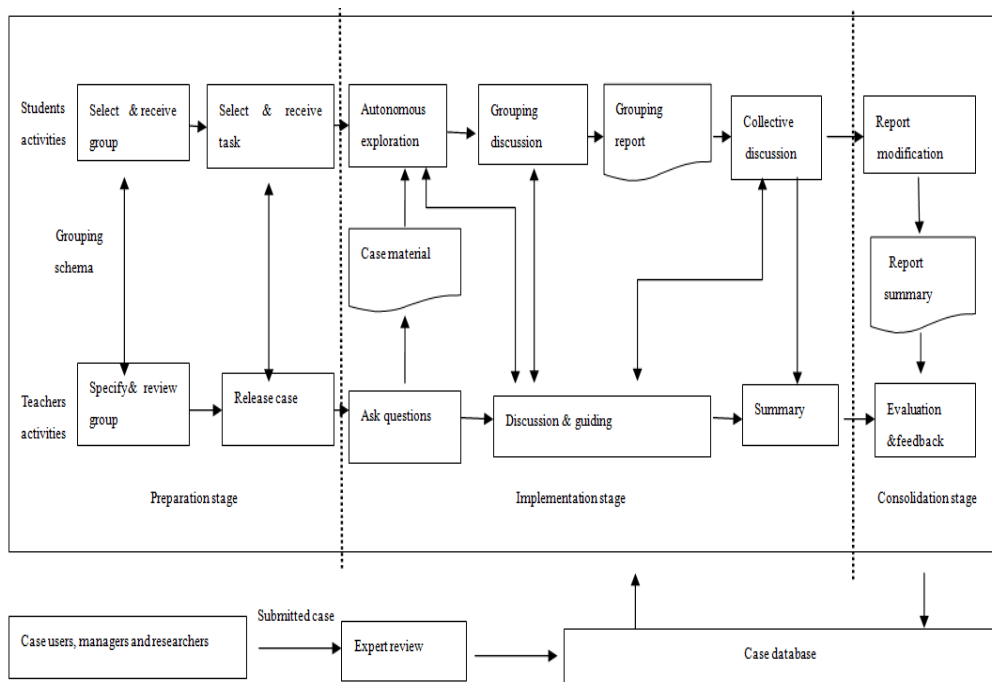


Figure 1. The Network Case-Based Teaching Flow Chart

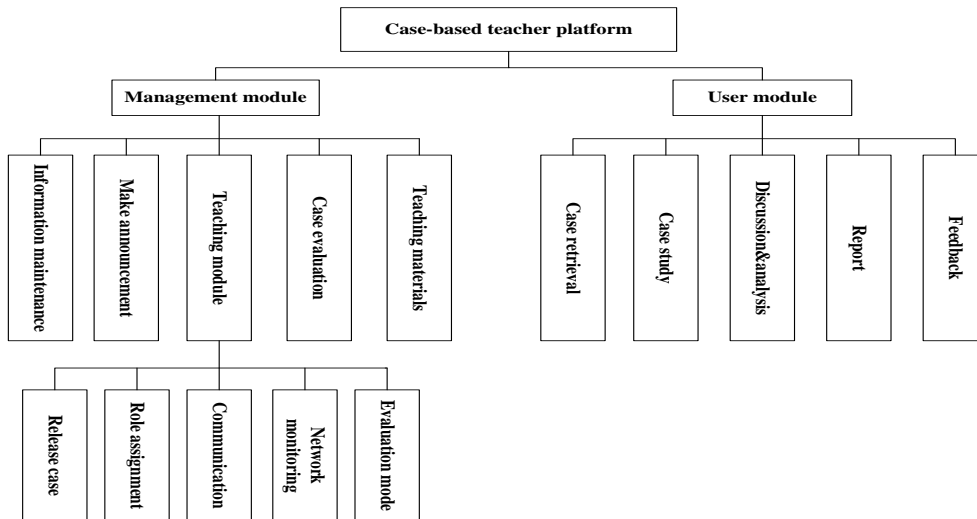


Figure 2. The Architecture of Teaching Platform

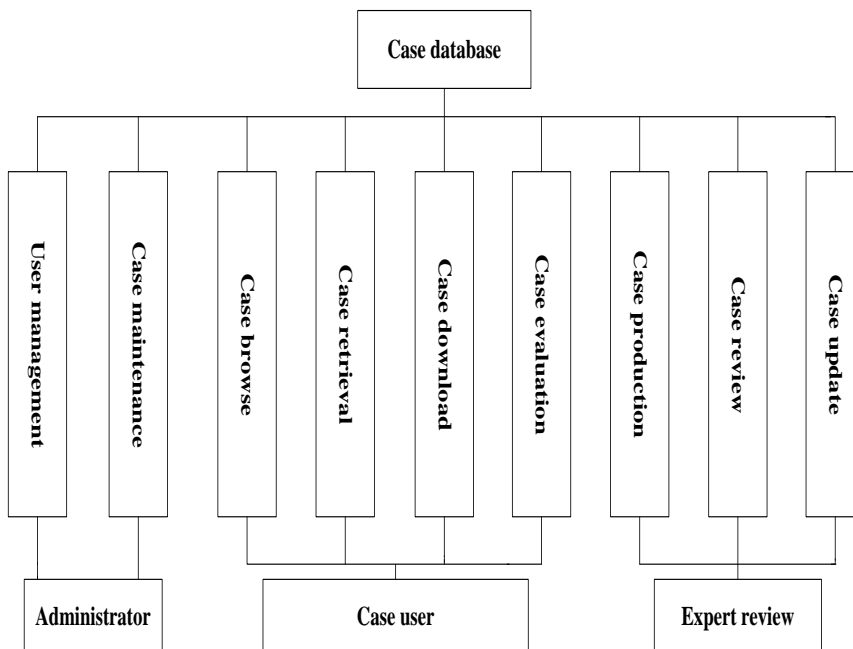


Figure 3. The Architecture of Case Database

5. Conclusions

This paper analyzes the current situation and problems of case-based teaching, and proposes the independent case-based teaching system. Constructing the network platform is the foundation of optimizing teaching process.

It will relieve teachers and students from fussy case-based teaching, stimulate students' active learning ability, and establish relatively independent case database and evaluation system. Case-based teaching is no longer simply affiliated to course teaching, but self-contained, and play the role of support and service.

The research achievements about independent case-based teaching system are very few, and there are still many problems to be solved to formulate a more mature theory and apply the theory to practice. Firstly, the network-based teaching method also has some

shortcomings, and the combination of traditional teaching method and network teaching will greatly improve the efficiency and effectiveness of classroom teaching. Secondly, the new teaching environment and new teaching method will lead to new problems. In the traditional case-based teaching, the teacher is in a dominant position and the knowledge is one-way propagation. In the network case-based teaching, the communication between teachers and students is in parallel and the knowledge is two-way propagation. Sometimes even more than the mesh transmission causes the problems of transforming from “teacher centered” to “student centered”; The problems of knowledge from “one-way propagation” to “two-way communication” and how to determine the quantified indicators of evaluation, are an important part of independent case-based teaching system in the future.

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References

- [1] W. Xu, “Use case teaching to improve the teaching quality of electronic commerce”, *Economic research journal*, vol. 18, (2008), pp. 207-208.
- [2] H. Tao and Y. Shun, “Electronic commerce teaching method reform and practice”, *Chinese university teaching*, vol. 10, (2012), pp. 67-70.
- [3] C. Jiao and L. Zhimin, “Case teaching under the network environment”, *China distance education*, vol. 3, (2005), pp. 34-36.
- [4] L. Yaling, “Comparative study between classroom case teaching and network case teaching”, *E-education research*, vol. 12, (2003), pp. 48-51.
- [5] Z. Yan, “Network case teaching research based on interactive learning environment”, *Northeast Normal University*, (2007).
- [6] L. Hongyan, “Reform study on aim oriented case teaching mode based on network”, *Liaoning Normal University*, (2006).
- [7] L. Shan, “Construction model research on case library of SNS virtual community within companies”, *Northwest Agriculture and Forestry University*, (2013).
- [8] X. Yongjun and S. Yang, ““4S” mode research on the management case library construction”, *Journal of Northeast Agricultural University (social science edition)*, vol. 7, no. 2, (2009), pp. 7-11.
- [9] L. Yanwen and G. Lingfang, “Empirical Study on the evaluation index system of case teaching”, *Management case study and review*, vol. 1, no. 4, (2008), pp. 69-75.
- [10] L. Wen and Z. Xiaoying, “The evaluation index of network case teaching”, *Distance education in China*, vol. 1, (2008), pp. 42-48.
- [11] Z. Meini and Z. Zhenwei, “Study on construction the evaluation index system of case base in colleges and universities”. *Journal of Southwest Jiao Tong University (social science edition)*, vol. 9, no. 3, (2008), pp. 101-104.
- [12] F. Yuguang, “Existing problems and countermeasures of management case teaching”, *Modern enterprise education*, vol. 5, (2012), pp. 90-93.
- [13] L. Yunqing, “An analysis of the existing problems and countermeasures in case teaching”, *Journal of Changchun University of Science and Technology (social science edition)*, vol. 24, no. 9, (2011), pp. 133-135.
- [14] W. Xiuzhi, “Several issues in the case teaching, China higher education”, vol. 12, (2006), pp. 80-83.
- [15] Z. Lihua, “Methods about case teaching in management”, *Dalian University of Technology press*, (2000).
- [16] C. R. Christensen, A. J. Hansen and L. B. Barnes, “Teaching and the case method”, *Harvard Business Review Press*, (1994).
- [17] C. Dezhi, “Management case compiling and teaching”, *Shanghai Jiao Tong University press*, (2005).
- [18] H. Kekang, “Teaching system design”, *Beijing Normal University press*, (2002).
- [19] R. Subhadip and B. Pratyush, “Understanding students’ experience of transition from lecture mode to case-based teaching in a management school in India”, *Journal of Educational Change*, vol. 13, no. 4, (2012), pp. 487-509.
- [20] R. J., “Case-based discussion: assessment tool or teaching aid”, *Clinical Oncology*, vol. 24, no. 10, (2012), pp. 649-653.

- [21] O. Eseonu, R. Carachi and N. Brindley, "Case-based anatomy teaching: a viable alternative", *Clinical Teacher*, vol. 10, no. 4, (2013), pp. 236-241.
- [22] Y. Tayem, "The Impact of Small Group Case-based Learning on Traditional Pharmacology Teaching", *Sultan Qaboos University Medical Journal*, vol. 13, no. 1, (2013), pp. 115-120.

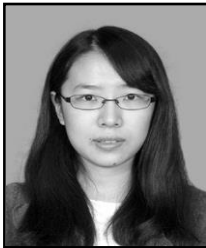
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