COPUS-based Observation and Analysis on Chinese and American College Classroom

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Abstract. Classroom observation is to improve teaching arrangements. This paper has analyzed classical classroom observation methodologies in and out of China, and selects COPUS as the main research protocol. Through observing typical teaching practice in China and the United States, groups of statistics characterizing teaching practice are drawn; based on the comparison and analysis on the statistics, some insights into improving classroom teaching quality in China are generated.

Introduction

Classroom clusters the most attention of educational research, so classroom observation is one of the effective approaches in optimizing teaching methods and improving teaching efficiency. Classroom observation has both professional and scientific features, and as a bridge between classroom teaching and educational research, it draws increasingly more attention in the education circle of China and other countries\(^{[1-3]}\).

The author had visited University of California, Santa Barbara (UCSB) as a one year visiting scholar since September 2016, during which participated the “Facing Stem: Allied Major Developing Project” Through in-depth and meticulous classroom observation and data analysis, the author had more profound understanding over American college classroom teaching practice. This paper relies on scientific classroom observation approach with the hope that this comparison of classroom teaching process in Chinese and American college can be used to guide the improvement of teaching quality in China.

Classroom Observation

Classroom observation refers to a teaching research methodology in education, which means observers, with definite purpose, employs senses and assistive tools (observation sheets, audio and video recording facilities etc.), directly or indirectly collect data from classroom context, then further research will be conducted based on the documents and data. This methodology improves students learning, instructor’s professional development, and institutional culture building\(^{[4]}\).

Classroom observation originated from western scientism thoughts, and the typical example is the Flanders Interaction Analysis System (FIAS), conducted by American classroom research specialist N. A. Flanders in 1960. In recent years, the noted research-LICC Paradigm- in Chinese classroom observation research field is developed by Professor Cui, Yunkuo at East China Normal University\(^{[6]}\). The LICC Paradigm’s hypothetical classroom teaching consists of Learning, Instruction, Curriculum and Culture- that is how the Paradigm gains its name\(^{[6]}\). Faculty Michelle K. Smith at University of British Columbia creates Classroom Observation Protocol for Undergraduate Stem (COPUS)\(^{[7]}\). In STEM courses (Science, Technology, Engineering, and Mathematics) at undergraduate level, COPUS has been implemented in a wide scale, and professionals in the field have grown profound interests. Table 1 is the comparison among several classroom observations tools in China and abroad.
Table 1. Comparison of classroom observation tools.

<table>
<thead>
<tr>
<th>Name</th>
<th>Founder</th>
<th>Time</th>
<th>Observation Angle</th>
<th>Recording Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIAS</td>
<td>N.A. Flanders</td>
<td>1960</td>
<td>Language Analysis</td>
<td>3 seconds/time</td>
</tr>
<tr>
<td>Tally System</td>
<td>E.C. Wragg</td>
<td>1994</td>
<td>Behavior Analysis</td>
<td>1.5 minutes/time</td>
</tr>
<tr>
<td>LICC</td>
<td>Cui, Yunkuo</td>
<td>2007</td>
<td>Multiple Dimension</td>
<td>Unset</td>
</tr>
<tr>
<td>COPUS</td>
<td>Michelle K. Smith</td>
<td>2013</td>
<td>Language and Behavior Analysis</td>
<td>2 minutes/time</td>
</tr>
</tbody>
</table>

By comparison, FIAS has the most recording frequency with 800-1000 data size in one class, which benefits the following-up data and structure analysis, but the operability is low. Tally System analyzed only the behaviors during the teaching process, e.g. making noise or talking without permission, improperly using material, and taking peers stuff without permission. The content design of the observation includes more negative behaviors, which shows the observed students more or less lack decent self-discipline, so this approach is better applied into classroom observation on primary and middle school students. LICC approach contextualizes classroom situation from multiple angles and characterizes the strength of reasonable deconstruction, rich content, and clear arrangement. The least of perfection is that this model needs to be cooperated by several researchers, for any individual ones, it may be difficult to implement. COPUS is the fairly recent research outcome with comprehensive observing angles and strong operability, suitable for researchers who are independently collecting data during the on-site classroom observation. Therefore this project takes COPUS as the quantitative protocol in classroom observation, supplemented by qualitative description after a real classroom observation. It is a research featuring both qualitative and quantitative methods.

COPUS-based Classroom Observation

The classroom observation of this project has five steps. First, classroom observation records the original data. COPUS classroom observation sheet sets time as the main axis: every two minutes is a unit, during the same time unit, multiple encodings are recorded. The specific records are shown as Fig.1: the observant ticks the corresponding blank in light with the actual situation at class, so the overall classroom teaching situation is recorded.

![Figure 1. COPUS classroom observation recording sheet.](image)

COPUS Classroom Observation Scale Table\(^8\) includes two sections: student behaviors and teacher behaviors. There are thirteen codes of the former, twelve codes of the latter. Table 2 illustrates these codes.

Table 2. COPUS teaching observation scale.

<table>
<thead>
<tr>
<th>Student Behaviors</th>
<th>Encoding</th>
<th>Meaning</th>
<th>Teacher Behaviors</th>
<th>Encoding</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>Listening or Note-taking</td>
<td>Lec</td>
<td>Lecture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ind</td>
<td>Independent Thinking</td>
<td>RtW</td>
<td>Real-time Writing on board</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CG</td>
<td>Answering Questions by Clicker</td>
<td>FUp</td>
<td>Follow-up question by Clicker</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WG</td>
<td>Worksheet Group</td>
<td>PQ</td>
<td>Pose Questions (non Clicker questions)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OG</td>
<td>Other Group Work</td>
<td>CQ</td>
<td>Pose Questions (Clicker questions )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AnQ</td>
<td>Answering Questions</td>
<td>AnQ</td>
<td>Listening and Answering Questions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SQ</td>
<td>Student Questions</td>
<td>MG</td>
<td>Moving in Classroom</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The second step is to log the original data on the record sheet into the data processing software (Excel or SPSS) following the format. Third, by using the data processing software, clarify frequency statistics of different encodings listed in Table 2. Fourth, based on the statistics, produce pie chart, column diagram or line chart about student and instructor actions.

Action and Practice are the most vital characters in classroom observation, requiring researchers to make all classroom observation rooted in teaching practice, so we chose “Database Foundation” course developed by the School of Computer Science, UCSB to conduct this COPUS-based classroom observation. This course has 90 students, the size of which is similar to the big classroom arrangement in China. Different from the teaching approach in China, in the American college, professors only give lectures, while Teaching Assistants (TA) mark assignments and organize the experiments, so the class observation needs to be classified. Fig. 2 is the observation statistics about professors’ lecture, while Fig. 3 is the statistics about TA’s experiment tutorial observation.

Fig. 2 illustrates the contrast between student and teacher behaviors in the classroom lecture. In student behaviors, lecture (L) listening and note-taking accounts for 69%, and question posing 31%. This statistics fully reflect that students have more questions and high involvement in class activities. In contrast, for instructor behaviors, lecture (Lec) and real-time writing on board (RtW) account for the most with 75% in total, which explains for lecture-dominant classroom in the United States, instructors mainly rely on traditional lecturing approach in delivering information. Besides, listening and answering students questions (AnQ) and demonstration via experiment and animation (D/V) hold 19% and 6% respectively, which correspond with the percentage of students question posing in student behaviors. Qualitatively, the observer describe this class as: classroom aura is light and pleasant, students have high involvement, and the overall teaching shows a favorable effect.
Fig. 3 illustrates the distribution of the time domain of student and instructor behaviors in the teaching process of the experiment classroom. The horizontal axis is time and COPUS classroom observation protocol takes fifty minutes as a recording unit. The vertical axis is the number of codes which illustrates that within two minutes unit time, students or instructors show different number of action codes. Having a clear contrast with Fig.2, students’ listening and note taking (L) in experiment classroom only account for 33%, which mainly appeared in the first twenty minutes of a lesson; Independent thinking accounts for the most to 39%, which happens in the later section of a lesson. This statistics has to do with the smaller experiment classroom size (25 students per team), and with flexible and free learning time. Students are given more time and space in independent thinking, thus this lighter and more pleasant learning atmosphere allows them to digest the knowledge lectured previously by the professors. If any questions pop up, the one-to-one question and answer section gets the timely and correct response from the TA. In instructor behaviors, lecture (lecture) and real-time writing on board do not account the most, with 26% in total, which exhibits great contrast with that in Fig.2. This contrast fully shows there is a clear responsibility division in lecture-dominated and experiment dominated class. In the lecture class, professors are only responsible for briefly summarizing and delivering knowledge and answering questions regarding concept understanding, while the construction of knowledge is completed in experiment class, the process of which needs more independent thinking and practice. The qualitative description of this class is: multiple and flexible class teaching approaches, active interaction between students and TA, sufficient learning initiatives, and good teaching effect.

To create an effective contrast, we use the course “Database Foundation” taught by author in China as the case, employ the video-taped resource to observe students when the American instructor and me deliver the same knowledge, and conduct the classroom observation research based on COPUS. Fig.4 is about the lecture observation and Fig.5 is about experiment classroom. Different from college in the United States, this course has simply one instructor for both lecture and tutorial (experiment direction).
The most distinctive character shown in Fig.4 is students’ monotonous behavior: in a fifty-minute class, students show one learning behavior-listening(L)-even when the instructor ask some questions (AnQ), students do not answer correspondingly. This teacher-centered mono-talking is common in Chinese college classroom. In China, teaching focuses on the systematic teaching about knowledge itself, ignoring students’ self-construction of knowledge. In the whole teaching process, the instructor is the academic authority, as well as dominator of class activities. Another important element (students) of teaching activity is marginalized; gradually, it becomes a custom that students listen without participation, detrimental for improving teaching quality. The classroom observation result in Fig.5 has distinctive improvements compared with Fig.4. In the experiment class, the size is around fifty, so instructors have opportunities of guiding students in a personalized way; in instructor behaviors, one-to-one guidance holds 26%, and level off with that in college classroom statistics in the United States. In student behaviors, Chinese class seldom organize team work, which is an important feature in American class culture: team work helps nurturing student with learning ability, cooperation capability, even the leadership. For Chinese colleges, this team work and class culture is worth learning.

**Some Insights Based on the Classroom Observation Statistics**

World-class universities are centralized most in the United States; its higher education catches common attention. After the comparison of instructor and student behaviors of college classroom in China and the United States, this paper produces the following insights on the future teaching:
1) Value Student Involvement. The effectiveness of teaching will be hugely improved if students are fully involved in curriculum design, course selection, and classroom participation. Students need to think about what they have learnt, do some real practice, connect with previous experience, and put the knowledge into real life, and then knowledge becomes part of their learning system. Learning should not be isolated, but has its social and cooperative traits, so in the future classroom teaching, more time should be allocated into discussion between students and instructors, and among students. Instructors need to further increase the students’ individual learning input, and to encourage students to express viewpoint and confusion; students should not be restricted to being lectured, while they need to truly participate in the learning process. When they are responding to other learners’ thoughts, they construct deeper understanding and shaper way of thinking. Student’s participation allows classroom teaching switch from passive to active leaning, and stimulate learners’ potential, imagination and creativity in the learning process; consequently, the harmonious class culture in which teachers and students constructing knowledge together can be built.

2) Stress Team Work. Team or group work is another teaching approach in American colleges. In any course, some projects have to be cooperated in a team. The higher education in the United States aims to nurture students with learning ability, cooperative ability and even leadership. Teamwork can best present students’ potentials. To pass the course assessment, students need to follow the collective rule and participate actively into team work. This American classroom culture greatly improves students’ communication, cooperation, and presentation ability, also gives vitality into the classroom.

3) Appreciate Diversity of Instruction Approach. The COPUS records and analysis reveal the monotonous teaching approach commonly found in Chinese college classroom. This monotonous teaching mode and approach suppresses students’ rights and willingness of getting fully involved in teaching and learning. The world trend now requests instructors to jump out of the traditional unitary teaching mode to actively work on the cooperative learning and investigative study, and change the style of monotonous talking. The back and forth question and dialogue between teachers and students, group discussion, animation or experiment demonstration, presentation and sometimes, proper blanks are effective elements of a classroom teaching. During this process, instructors need to improve teaching competence and quality, actively discover and extract questions in the teaching practice; use various research documents or outcome to guide the practice, then the diverse instructional methods and modes can be generated.

Conclusion

With the background of teaching reform, to dig out the potential value of classroom observation, the current approach should be improved. The COPUS-based classroom observation offers a scientific research approach with high operability. With the real and effective classroom observation data, instructors can fully comprehend teaching situation and seek the effective path in improving teaching quality. Meanwhile, the classroom observation reflects the real situation of education, so it plays a critical role in guiding practice, promoting teacher professional development, and encouraging the current class visit and evaluation more professional.

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References


