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Teachers' Questions in the Classroom

Abstract

The paper presents a case study of how a well thought out teacher develop program can contribute positively towards innovative education of tribal children. The paper draws upon classroom observation of teacher's practices, children's reading writing and comprehension (pre, mid and post) in project schools and control schools and qualitative data from teacher and student interviews. By enabling teachers as professionals through professional development and not just training, it was possible to create an ecosystem where all stakeholders were invested in the education process. This study indicates that the successful implementation of the new practice results in improved reading ability, visible increase in student attendance and greater student interest towards school.

While indigenous peoples make up around 5% of the global population, they account for approximately 15% of the world's extreme poor, and regularly appear at the bottom of human well-being index ratings. One of the key causes for this is the lack of quality education delivered through culturally appropriate teaching strategies. The primary focus of this paper is to explore the how a professional approach toteacher development enabled an ecosystem where children have better reading and writing ability than average. The NGO, Agragamee has developed a unique reading and writing program for children in the first three years of schooling. Children in Agragamee School achieved fluency and were easily able to cope with the standard textbooks of Odisha state by the time they entered class III. By reducing dropout rates the method had increased the chances of success of students in school while encouraging the teachers to be invested in the education process. Due to the success, Agragamee was awarded a grant to test this method in 18 government schools across three districts. Key to the implementation of this method was preparing teachers to adopt and engage with the creative language development processes. Young, fresh support teacherswere hired and to overcome the challenge of de-schooling teachers used to traditional pedagogies. A series ofteacher development workshops for the support teachers was conducted. New content and material to support the reading and writing program were developed and the teachers were familiarized with these.

Introduction

Teachers' questions are a normal feature of all the classrooms and Carlsen (1991) in his review of questioning in the classroom described discourse in the classrooms as a type of language game in which there were four possible moves: structuring, soliciting, responding, and reacting. Teachers use voice, tone and gaze along with explicit direction to manage student behaviour and action in class. In addition to these, teachers extensively use questions for various purposes in the classroom. Teacher's questions are the dominant form of

verbal interaction in the classroom and serve an important role in the pedagogic discourse.

As part of doctoral work, research was undertaken to understand science teacher praxis in schools catering to students from different socio-economic backgrounds. Ethnography was conducted in four schools in Bangaluru city: two government schools (GA,GB) and one private unaided English medium school(PU) affiliated to the Karnataka state board and one private unaided international school (PI) affiliated to an international board. Government schools lacked adequate classroom space and laboratories, unlike private schools. The pedagogic processes followed in the three schools, GA, GB and PU under the Karnataka state board state were similar, but the students in government schools received less classroom instruction. Teachers drew students' attention to information from the textbook that was to be remembered and reproduced. Sharma (2007) describes how science in textbooks is treated as a body of canonical knowledge that students have to learn by rote. Teachers did not give importance toprocesses associated with scientific reasoning such as observation, hypothesising, examining evidence and reasoning.

Conceptual framework

This paper discusses teachers' use of verbal questioning within the formal classroom setting. Basil Bernstein's concept of the pedagogic device that mediates the social order through its distributive, regulative rules and evaluative rules, and the notion of education as a field, in which knowledge is recontextualised, provides the theoretical framework for analysis. Bernstein (1990) theorised classroom practice as constituted by the pedagogic discourse. This discourse is socially constructed by recontextualising agents such as teachers who select and embed two discourses, instructional discourse (ID) and regulative discourse (RD), to produce a single discourse, the pedagogic discourse represented as ID/RD. Bernstein (2000, p. 31) defined the pedagogic discourse as a rule which embeds two discourses; a discourse of skills of various kinds and their relations to each other, and a discourse of social order.

"We shall call the discourse which creates specialised skills and their relationship to each other instructional discourse, and the moral discourse which creates order, relations and identity regulative discourse. We can write it as follows:

Instructional Discourse ID

Regulative Discourse RD

This is to show that the instructional discourse is embedded in the regulative discourse, and that the regulative discourse is the dominant discourse in the classroom."

The paper first offers a description of the various styles of questioning that could be seen in the classrooms and then goes on to analyse the functions served by teachers' questions using Bernstein's concept of the pedagogic discourse.

Styles and purposes of teachers' questions

There are distinct ways in which teachers ask questions in their classroom and it was possible to observe the following styles of questioning in classrooms across the different types of schools.

Conversational

Sarcastic

Scolding

Cuing

Quizzing/Interrogation

Conversational Style:

This was relatively less frequently observed within the formal classroom setting and was more commonly observed in the international school. Here are some examples of this style of questioning

i. During a tenth standard class that was being co-taught by two teachers, Maya and Mohan there was a brief conversation between students about methods of counting and the use of tranquilising guns on tigers. Maya responded to this discussion:

Maya: Last time, we talked about one person (pause).
Students (overlapping): Ul..; Bina Ullal….; UlhasKaranth.

Maya: Do you find it difficult to remember these names?

ii. In one of the government schools the teacher, Sharada, was teaching a physics lesson. A girl student was reading out sentences from the unit on generators, while a boy was asked to diagram it on the black board.

Sharada: Next.
The girl read another sentence.
Sharada (to boy drawing on the board): *Are you done?*

Sarcastic style:

A few teachers resorted to the using sarcasm while questioning students in the classroom. Here is an example of this from the international school where Kaveri was teaching Biology to standard IX
Kaveri: Multicellular is what? (Pause)
Girl2: Multicellular means made up of many cells.
Kaveri: Multicellular allows cells to be … give me the word…

Students made three or four attempts, their responses overlapped with each other. Someone said "specialised"

Kaveri: Specialised! If you expect me to teach English, I will not do it. Multicellular organisms can have specialised cells. Do they have brains? Do they have anus, mouth?
Students (very soft and hesitant): No.

Scolding questions:

In several instances teachers scolded students by using questions as the examples below indicate.

i. While teaching the VII standard class in the private English medium school, the teacher Savitriwas annoyedby student behavior.

Savitri: (to a boy who seemed to have some sort of toy) What is this?
Savitri:(to another boy who was copying from his neighbour's notebook): What is the use of writing on the board?

ii. The following episode of note-taking was from a Physics lesson taught by Sharada to standard X at one of the government schools. Sharada explicitly mentioned the time pressure she was under to complete the portions.

Sharada (suddenly to boy in front, using a very loud voice): *What is that* Aanh ? (She hit him on the head with her open hand.) *Have I given notes last time?*

Cuing style:

This type of questioning serves to draw students' attention to important words by altering tone and spacing of words.

This extract is from the English medium section of a government girls' high school where the teacher, Shivanna, was teaching biology to IX standard

Shivanna drew the nucleus and chromatin on the blackboard and named the various parts in English followed by Kannada. On the board, he labelled the diagram in English and using brackets also wrote out the

Kannada terms beside the English terms. He then proceeded to explain about chromatin.

Shivanna: Chromatin is made of (pause) DNA and protein (emphasis) (pause). Chromatin is made of (pause)...?

Student Chorus: DNA and protein.

It may be observed that syntactically the teacher does not use the question form, however the 'question' is indicated by a rise in tone followed by a pause.

Quizzing/ interrogation style:

This form of questioning was used mainly to help students recall the right answers during revision lessons.

i. In an episode observed in the private English medium school, Shivraj was taking a revision class on optics for standard IX. He quizzed the students about various optical instruments. The instruments described in the textbook were camera, simple microscope, telescope and binoculars.

Shivraj: What kind of lens is in camera?

Students: Convex.

Shivraj: Convex. (pause) What kind of image is formed?

There were various responses, overlapping with each other and several students said "inverted".

ii. In another episode in the same school, Shantala was revising Chemistry with VII standard.

Shantala: I will ask, if you can't answer, question will pass (pause). You cannot sit down till correct answer is told (pause), ok?

Shantala (to boy on first row, left extreme): What is a mixture?

Boy1 (softly, inaudible at first, then as Shantala prompted he completed the answer): ..are (pause) combination of ...

Shantala: (prompts) two or more...

Boy 1: Substances (pause) they may be in (pause)...

Shantala: (prompts) any proportion and (pause) (no response from student) the constituents retain (pause)...

Boy1: the original properties.

Shantala: (to next boy) What is compound?

Boy2: (indistinct)

Shantala: Next

Teacher – interrogation takes place during the introduction and during and after the explanation in order to recapitulate points explained. Teachers also articulated that questioning helped them to evaluate whether *'students have learnt/got it into their heads'*. Revision for tests consisted of verbally asking questions from the 'notes' that students are expected to memorize.

Kaveri from the international school mentioned that asking questions from the students helped her to know whether they were *'getting it'*. She also used questions as a way of ensuring that students were attentive to what was being taught and at times used questions to prove to students that they had to learn the lesson and could not afford to take it easy or *'goof off'* as she put it. The following extract is taken from a lesson transacted by Kaveri.

Kaveri (very loud): Did I ask you to do that? (Pausing and looking pointedly at some students) You enjoy the noise (sarcastic smile). Now ... , we have done amoeba of protista. I want some characteristic of protista.

Seven students, both boys and girls, raised their hands.

Kaveri (to boy): Aakash

Boy1 (Aakash) (he is seated and the textbook is open on his desk): (indistinct)

Kaveri: You are reading from the book (raising voice and slowing rate of articulation). Do not read from the book.

Boy 2: They are unicellular.

Kaveri: Unicellular means? (pause)

A few students, both boys and girls, attempted to articulate the meaning of the term 'unicellular' according to their understanding, but their attempts were not accepted by Kaveri.

Girl1: They have a distinct nucleus (answering the question about characteristics of protista and not the sub question about unicellular).

Kaveri: Very good, a distinct nucleus (emphasis) and? (pause).

Boy2: (indistinct) double membrane.

Kaveri: Don't give me double triple and all that. Say nucleus is surrounded by a nuclear membrane.

Kaveri: Amoeba takes in water all the time. How?

Boy 1: Osmoregulation.

Kaveri (loud, slower articulation): Don't flash words at me.

Kaveri: Amoeba takes in water (pause). How?

Three hands were raised.

Kaveri: Who can answer?

Boy2: Osmoregulation.

Kaveri: This is why you don't do well in the test (mimicking/mocking voice). I like biology, it is easy, I don't know why I don't do well in the test. (pause) (loud, slower articulation) Because you have not answered or understood the question (pause) I asked how amoeba takes in water and you name a process. Now, how does amoeba take in water? (Looking towards a girl student) Suchitra?

Role of teachers' questions in the Pedagogic Discourse

Teachers' questions can serve a number of purposes as the above extract indicates. For the purposes of the present analysis, they are classified into questions that are part of the regulative discourse and questions that are part of the instructional discourse. The regulative discourse is the embedding discourse and produces order in the instructional discourse (Bernstein, 2000: p. 34).

Questions that formed part of the Regulative Discourse in the Classroom

These include questions used for getting the students attention, questions used for maintain students' attention during the lesson and finally questions used to monitor students' task completion.

Getting the students' attention

In order to get the students 'attention at the beginning of the period, teachers used questions like:

_Why are you still talking?; ―Don't you want attendance? (Gayatri, GAH)

_It is 10:45, can you read the time? (Kaveri, PI)

_Mr. Verma, you appear confused about where to sit. Each time, the same issue is coming up. Not ready to start class? Shall I talk to your class teacher? (Sheela, PI)_Can we start?' (Mohan, PI)

Except for Gayatri (GA), the teachers in the government schools generally did not need to specifically get the students'attention as there was a tacit understanding about expected behaviour once the teacher entered the class. Whenever a teacher or other authority figure, including the researcher, entered the class the students chorused out a greeting. The greeting invariably signalled to the students that they needed to stop talking among themselves and await instructions.

At the private school, PU, none of the teachers, Shivraj, Arati, Shantala, Savitri used questions to gain the students' attention at the beginning of the class. As soon as the teacher entered the class, sometimes even as

another lesson was in progress, the students stood up from their benches and chorused a greeting, and would sit down silently when the teacher asked them to do so. However, for two of the recorded lessons, Shivraj had to raise his voice and command the students to settle down before he could start the lesson. On both these occasions, there were school-wide extracurricular activities in progress, making the students quite excited, and were therefore exceptions to the general norm.

By the time students entered the higher classes at the government schools and at the private unaided school, they had got thoroughly socialised into the expected patterns of classroom conduct. Teachers did not have to make an effort to get their attention at the start of each lesson as it was automatic for students to be ready for the teachers' instruction. If, on some occasions, students were distracted or excited and failed to assume the silent stance as the teacher entered the classroom, they were chastised and very quickly brought to order. Teachers in the government schools and the private State Board school did not have to overtly signal to the students that the lesson is about to begin.

At the international school, however, students did not stop talking as a matter of routine when the teacher entered and teachers had to deliberately signal the start of the teaching interaction. The teachers invariably had to ask the students if they were ready for the lesson. It must be mentioned that "asking" in this context did not mean that the students had a choice in the matter, but reflected the different linguistic code employed by these teachers to exert authority over the students.

In a series of articles (Bernstein 1966, 1971b) quoted by Easthope et al (1975), Bernstein developed a set of ideas relating to social order in schools. The different manner employed by teachers in different types of schools is a reflection of the different social class of the students in these schools. The theoretical strand that informs Bernstein's writing is Durkheim's distinction between mechanical and organic solidarity. "...social order arises out of the hierarchical nature of the authority relationships, out of the systematic ordering of the differentiated knowledge in time and space, out of and explicit, usually predictable, examining procedure. Order internal to the individual is created through the formation of specific identities. The institutional expression of strong classification and framing creates predictability in time and space Bernstein (1971: p. 63).

As a way of maintaining students' attention:

In between explanations, teachers asked questions as a way of maintaining students' attention to their talk.

—*Have you understood? Does anyone have doubts?* (Vimala, GAH)

—*What are you looking at?* (Sairabano, GBG)

—Where is your classwork? Is this your classwork? (Savitri, PU)

—What are parasites? Upasti (to a boy) (pause), you want to see who is going outside, stand up and see (pause). No? What are parasites (pause)? You don't know the answer? Shall I repeat it? (Kaveri, PI)

Monitoring students' task completion:

This type of question was routinely asked in all the classrooms observed and they are familiar to most of us. For example, —*Have you finished?; —Could I see your notebook now?; —Have you completed writing the notes?*

Questions asked as part of the Instructional Discourse in the Classrooms

Purposes served by questions that formed part of the Instructional discourse included checking at what part of the content had to be taught; to establish the context of the lesson to be taught; to emphasise key ideas/concepts/information to be memorised; to elicit the expected 'correct answer'.

Examples of questions used by teachers during the teaching of content (instructional discourse) are presented below:

To check what part of the content had to be taught:

In some of the classes recorded at the government schools, teachers asked the students what topic had been covered and then proceeded with the lesson. Some examples of this type of questioning are given below:

Charumati (GBG) asked her students at the start of the lesson: — *Have we done cells? What is a cell?* Once the students responded to these two questions, she was able to locate her place in the topic and proceed with the lesson.

Sharada (GAH) asked her X standard class:— *What had we done last time? Had we covered finding the square roots of numbers that are perfect squares? How do we find square of a one digit number? Of two digit? Of three digit?* Each time, she received an affirmative response chorused out by some of the students. After this, she proceeded with demonstrating how to work out square roots of numbers having decimals.

Gayatri (GAH) asked at the start of a IX standard physics class: *What are we doing?*

Students: *Electric circuits.*

Gayatri: *Static electricity finished?*

Students: *Oonh miss.*

This type of questioning by the teacher to actually locate the class's place in a lesson was not observed in private schools. In the government schools where field work was undertaken, the teachers seemed to genuinely require reminders about where they had left off and from which point in the lesson they needed to continue. This may be interpreted as a somewhat mechanical approach to lessons by the teachers. Teachers taught the lessons in the same invariant sequence as they occurred in the textbook. As already described, the lesson transaction, in most instances, consisted of directly reading out and paraphrasing information given in the textbook and therefore required no prior planning by the teacher. The even more mechanical task of a place holder in the text could thus be delegated to the students. These questions, asked at the beginning of the lesson could also be considered to be part of the structuring moves, as defined by Bellack et al. (1966). Structuring moves set the stage for solicitations and response related to the lesson to be taught.

To establish the context of the lesson to be taught:

Very often, the teachers in the government schools moved straight into the lesson after ascertaining where the previous lesson had left off. No further structuring questions were felt to be necessary and were considered a waste of time and effort by the teachers. However, in some lessons, teachers began with recall questions as a way of establishing the context of the lesson to be transacted in terms of its content, as this extract at the start of a VII standard class in government school, GA, showed:

Shanta: *What is element?*

Chorus: *Elements are substances that contain only one kind of matter.*

Shanta: *One of you say it.*

Boy: *Elements are substances that contain only one kind of matter.*

Shivraj began his lesson to IX standard at PU by telling the class to be silent and then asked the context establishing question.

Shivraj: In the last session, we are learning kinetic energy. What is kinetic energy?

Boy1: (Stood to answer – indistinct)

Shivraj: What is energy?

Boy2: (No response)

Girl (last bench): Energy is the capacity to do work.

At PI, at the start of a class for VIII standard students about sound energy projects, Sheela began by asking students to recall the ideas they had generated for investigation. This had been done in the earlier class.

Sheela: What were the questions? (The reference was to the project the students were working on).

As she elicited responses to the questions, she wrote them on the board, radiating outwards from the central word, "Project". The phrases were "relate it to waves, etc"; "identify musical instrument"; "how is sound produced" ; "modify".

Clearly, Sheela was not trying to help students recall particular information in this case, but setting the context for the students' classroom task by referring back to the ideas generated in the previous class, which formed the basis for the project they had to work on in groups.

To emphasise key ideas/concepts/information to be memorised:

These questions were typically heard in the lessons of the government school teachers but were used to varying extents by teachers in the other schools. Although students in the international school did not have to memorise answers, extracts presented in the section on revision indicated that teachers asked questions that required students to recall information considered important. Examples of these have been described earlier and a few more have been included here:

While taking a class for VI standard in the government primary school, GAH, about food, Vijaya used the familiar structure of making a statement, repeating it with emphasis on the key word and then immediately turning the sentence into a question.

This extract was from a lesson about polygons taught to standard IX, by Savita in the government girls' high school (GB):

Savita: A polygon is a closed figure. It is bounded by three or more than three sides. (Savita then translated this sentence into Kannada). The sides have to be coplanar and non-collinear. (She explained coplanar in Kannada by giving example of the blackboard and the door and talking of lines drawn on them). With all these points, can you say what a polygon is?

Girl: A polygon has three sides or more than three sides that are coplanar and non-collinear.

Savita: Now take down, a polygon is a figure enclosed by (pause) enclosed by (went to the blackboard and began writing) three or more line segments which are coplanar (pause) ... coplanar, non-collinear (pause), non-collinear and intersecting each other.

To elicit the expected 'right answer':

Teachers often used a series of questions to elicit the right or expected answer to the question as in the case of Bindu and Sheela at PI, who were trying to lead the students to the desired answer about the food group present in vegetables.

Bindu: What do vegetables give us?

Boy 1: Starch

Bindu: Not starch.

Boy 2: Carbs.

Bindu (seemed not to catch what the boy had said): No, not starch.

Sheela: Can we give them a clue, Ms K?

Bindu: Remember, we studied about plant cells? What is the cell wall made of?

Some teachers, however, merely indicated that the answer given was not the expected one, repeated the question or directed the same question to another student.

In the following extract, it can be noticed how Shanta indicated that the answer given was not the correct one.

Shanta: *How many alphabets in English? (pause) Twenty- six (emphasis). How many alphabets? (pause)*

Chorus: *Twenty six.*

Shanta: *How many elements?*

Chorus: *Three*

Shanta: *Annh? How many?*

Students Chorus: *109.*

In the following extract from a revision class in Biology taken by Arati in the private school (PU), it was possible to notice how the teacher was trying to get the students to arrive at the correct answer. The IX standard students were revising the lesson about micro-organisms and diseases.

Arati: Diseases spread through air (pause). Can anyone tell how?

Girl 1: By cough.

Arati: Yes, but don't just say cough, add something to it.

Boy 1: When they cough.

(Girl remained standing)

Arati: When who coughs?

Boy1: Humans.

Arati: All humans?

Boy 1: Yes.

Arati: If any one coughs, (pause)… we will get disease? Infected person (emphasis)

Eder (1982) noted that teachers rarely acknowledged student remarks that are not topically relevant. The discussion lessons held at the international school there were an exception where teachers did acknowledge students remarks even if they were not directly relevant to the lesson. Sometimes as in the case of Shivraj (PU), it was possible for the teacher to leave unacknowledged, a student question even if it was relevant to the topic. Given below is the extract from the lesson:

While teaching VIII standard, Shivraj referred to earlier lessons by asking students to recall the "three parts of an atom" and then he mentioned that atoms could lose or gain electrons. Next, he proceeded to draw the diagram of an atom: a small inner circle had PN written inside and concentric circles were drawn around it. Though he did not mention it in this lesson, students had already learned from earlier lessons that electrons revolve around the nucleus.

Boy (responding probably to the diagram, rather than the teacher's statement about atoms being able to gain or lose electrons): When you said that electrons revolve round nucleus, that time all electrons will have same speed, sir?

Shivraj: Ah yes, atoms can gain or lose electrons. Naturally, we know electron is negative, negatively charged electrons are anions, positively charged electrons are cations. (emphasis) What is cathode in electricity?

Teachers everywhere tend to maintain control over the discourse in the classroom. Shivraj's lack of response to the student's question about the speed of electrons revolving around the atom could have been a way of avoiding loss of epistemic authority in the classroom. Both Farrar (1988) and Carlsen (1988) noted that teachers may use sequences of questions to maintain tight control of discourse topic.

Speaking from the sociolinguistic

perspective, Carlsen (1991) offers a possible explanation for the teacher-dominated interrogative style of instruction so commonly found in a variety of classrooms across different school types. Although such a style of instruction may reinforce an imbalance of speaking rights, at times this may be necessary in the classroom. Active student verbal participation in a lesson may frustrate the teacher's wish to get through the planned material. Sustained questioning of a single student, although cognitively valuable, may cause restlessness and loss of interest on the part of other students. Students may generate questions that the teacher is unable to answer. These explanations may seem speculative, but they indicate the complex, multiple goals of classroom instruction.

Studies by Mishler (1975a, 1975b, 1978) indicated that first standard students react very differently to questions from their teacher than to questions from their peers. Responses to teacher questions tended to be shorter and declarative. Students and teachers also differed in the way they responded to questions in general. Teachers, tended to take control of the flow of discourse away from students who asked questions, often by responding with another question. Mishler argued that these and other characteristics of classroom discourse reflect role relationships between participants, especially along lines of authority and power. His interpretation is helpful in understanding why student questions are, in general, rare in classrooms. Given the status difference between teachers and students, interrogation of the teacher may be viewed as socio-linguistically inappropriate to students and teachers.

In this context, it was interesting to note an example of student lead questioning that took place in a class taught by Meena in the international school. During a tenth standard chemistry lesson, Meena did her best to respond to a very persistent line of inquiry by a student regarding volume changes that could take place when two miscible liquids were mixed together. Eventually, Meena managed to assert her control over the discourse and moved the lesson in the planned direction. Before doing so she actually went to the extent of performing an unplanned experiment in front of the class in order to demonstrate to the student that she was correct. (Actually she was wrong in this case). The extent of student interrogation observed in this class was exceptional and was not observed in any other classroom.

Conclusion

Literature about science education points to the importance of the regulative contexts of science classrooms (Rogoff, 1990, Cole, 1996, Duschl, 2008) Synthesising the learning sciences research and science studies research, Duschl (2008) suggests that science education should focus on three domains: conceptual and cognitive processes; epistemic frameworks and; social processes that shape how knowledge is communicated, represented, argued and debated. In order to promote better science education there needs to be a shift away from teacher controlled lessons towards those thatenable greater learner control, inquiry and experimentation. Teachers are expected to promote inquiry by asking open ended questions that provoke student thinking and conceptual development. This implies a change in the regulative discourse in order to facilitate the production of the appropriate instructional discourse as suggested by science education research.

However, as discussed in this paper,

actual classroom practices across the different school types reflected a regulative discourse that requires teachers to be in control. There was little or no conversation between students and teachers in the science classroom, with a few exceptions being seen in the case of the international school PI. The pedagogic relationship was not a dialogic relationship, but instead the teacher was a relay of knowledge that had to be reproduced by the student in the appropriate form as required by the formal examination system. In the international school, students from elite social class backgrounds were able to mitigate the teacher control of the pedagogic discourse and the paper has indicated that the regulative discourse was contested to some extent in this school. If we want to see a different kind of science classroom then teachers' implicit sense of the regulative discourse in the classroom has to be altered. Specifically focused teacher education research as to how this can be accomplished is sorely needed.

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