Contributions to These Practices from a Professional Program

Ugur Kale
Indiana University

Introduction

Teacher professional development is assumed to be enhanced through reflective, collective, collaborative professional communities (Little, 2003).Universities in these teacher community developments play a big role by providing teachers with pedagogical helps and professional developments. By not only encouraging teachers to go to conferences, do research publications, and use technology in their teaching practices but also leading them to work together, evaluate each others' instruction, and do collaborative lesson plans, these professional university driven communities seem to remarkably contribute to teachers's teaching practices and professional development.

Getting to know how these communities influence the teaching practices through analyses of teaching applications in classrooms become an important issue not only for the communities as a way of assessing their programs but also for many practitioners and professionals in education who would like to see possible teaching situations, issues, teaching strategies.

As one group of these practitioners and professionals, instructional designers and instructional theory developers are aware of the importance of the possible situationalities for teaching practices. It is because one of the main goals for these professionals is to describe how instruction should look like, what possible conditions and issues may take place will be, and so on within instruction. Unlike learning theories that describe how learning occurs, instructional theories are more goal-oriented and tend to give more explicit ways to follow in supporting learning in instruction (Reigeluth, 1999). In this respect, instructional theories are expected to provide methods in details and variety of situations. In that way, audiences for the theories who are teachers, instructional design and theory developers, and other practitioners interested in pedagogical issues, can make sense of and apply these prescriptive theories into their practices successfully.

The case study presented in this paper aims to document the teaching practices of four high school mathematics teachers who have been involved in a math professional development program provided by one of the Midwest Universities. This paper aims at benefiting the professional development program and many educators, such as instructional design and theory developers by laying out the teachers' teaching practices and examining influence of the program on these practices.

In order to analyze teaching practices, I thought it is important to find a well-accepted framework so that laying out the individual aspects of the teachers' instruction becomes easier and meaningful. For this study, I chose Gagne's nine events of instructions as the framework because as accepted by many professionals, Gagne's events are assumed to be the most general events that can take place in any type of learning situations. For a better learning, these events should be accomplished to satisfy the necessary learning conditions for relevant learning type (Aronson, 1983) such as motor skills, intellectual skills, attitudes, cognitive strategy and so forth. Even though "Gagne's nine events of instruction are his methods of instruction" (Reigeluth, 2003), these general events -methods hardly mention the situations where the methods should be applied in different ways. That's why, any situational differentiation that could be found in the teachers' teaching practices may provide details to applying these nine events under many conditions, which Gagne gives little guidance about. Below are the nine events that Gagne proposes:

Event 1- Gain the Learner's Attention: This event includes techniques to appeal learners' curiosity and interest such as presenting something novel, giving challenging situations or problems, putting students in uncertainty, and so forth.

Event 2- Inform the Learner of Objective: This is about familiarizing students with what they will be learning during the lesson and how they will be assessed. Knowing what to learn provide students with a determined focus in their learning.

Event 3- Stimulate Recall of Prerequisite Learning: This is to help students to recall their necessary prior knowledge and experiences to understand the new acquired information in a meaningful way.

Event 4- Present Stimulus Material: It is the presentation of the content through variety of media and approaches to expose information to the learner.

Event 5- Provide Learning Guidance: This is about the methods such as providing examples, hints, cognitive tools - handouts to make learning easier.

Event 6- Elicit Performance: This event is about providing opportunities to students for practicing through having them "do" instead of having them just "listen".

Event 7- Provide Feedback about Performance Correctness: This includes methods in which learners are given a description of how they have done in given practices. It could be verbal, written, or other forms.

Event 8- Assess Performance: It is more about a process of assessing students' performance after they have been exposed to a learning event.

Event 9- Enhance Retention and Transfer: This is the event where learners are given more opportunities to practice or review the materials so that they can recall them in a later time easily and meaningfully.

Method

This study is a case study in which a group of teachers' teaching practices and professional development experiences were examined in a bonded system, which is a professional development community that affects these practices and experiences. As Merriam mentions (1998), in case studies, researchers are more interested in discovering and interpreting based on a phenomena taking place in a bounded place, instead of testing a hypothesis. The teachers' teaching experiences within their professional development process is the phenomenon that I am trying to "discover" through this study. The approach I took for the study could be hermeneutic (Brantlinger, 1993) because I try to see the teachers' practices from their "eye" along with myself interpreting what they "see".

Setting & Participants

Participants were four high school mathematics teachers that have five, thirteen, sixteen, and twenty-eight years teaching experiences respectively. They were currently participating in a professional development program provided by one of the Midwestern Universities. This math teacher professional development program aims at engaging many practitioners, secondary and high school math teachers, university mathematicians and mathematics educators in a collaborative environment where mathematics teachers can get benefit for their teaching practices and professional developments.

The teachers involved in this study were currently teaching algebra, geometry, and calculus, to 9-12 graders by the time study was being conducted. While the teacher-George with a twenty eight and Kurt with thirteen years teaching experiences had been involved in the meetings of the math professional development program for more than 2 years, the teacher-Kristen with 5 years teaching experience recently got involved in meetings for last couple of months. On the other hand, while the other teacher-John with sixteen years teaching experience had been in the professional development program for 2 years, he had not been able to attend the meetings regularly because of his busy schedule. The teachers were all from a same high school in one of the midwestern city that is dominated by a big university by which the professional development program has been driven.

Researcher

Pursuing a doctoral degree in instructional technology department at a school where the professional development program had been carried out made it easier for me to contact with the manager and the director of the math teacher development program. After initial contact and agreement based on my research purpose and interest in instructional theory development and possible benefits that the program can get from the study, I was allowed to ask the teachers to participate in the study. I was introduced to the teachers as a graduate student member doing research studies for the program.

Data Collection and Analysis

The data collected are mainly through interviews. In addition, observations of initial meetings and document analysis regarding the mission and the structure of the program were used as ways of collecting data.

Document Analysis

Mainly, I searched in the website of the program for its mission, activities, regular meetings and so forth. It just gave me an initial plan for meeting the director and the manager of the program and proposing my research agenda.

Observation

To be introduced to the teachers in the program, I participated in one of the regular meetings taking place within the program. This gave me a chance to see the structure of meetings and issues held during the meetings as well as an opportunity to meet the teachers face to face.

Interview

Convenience sampling approach was used to involve teachers in the study because by the time study was started, it was getting close to the second half of the first semester in high schools when many teachers are pretty busy their schedules for the school.

One or two weeks after the meeting I attended, teachers were emailed by the manager of the program whether they would be willing to participate in a proposed study for which I would be interviewing them. Among them, did four teachers agree to participate. All of the teachers were (45 minutes to 1 hour) interviewed in their schools within the following 2 weeks.

The questions to be asked in the interviews had three different facets: The first one included general questions such as the teachers' years of teaching experiences, how they had got involved in the program, what their initial expectations were and so forth. The second one was about teachers' teaching practices in details. Gagne's nine events were used as a framework regarding what tactics teachers are using, and what they are encountering in each event. The last part was focused on how the teacher professional development program had been contributing to their teaching practices and what their possible suggestions would be regarding a better professional program. Each teacher's interview was audio taped and transcribed for the analysis.

Findings

The Teachers and the Program

Teachers were mainly participating in the program by attending two main meetings held in the university; (1) joint meetings in which teachers, university mathematicians and mathematic educators gathered together to discuss the future activities, goals, and directions for the program. Approximately 40 joint meetings had been held since 2000, with an average of 5 meetings per each semester (including summers). (2) The other meetings were those in which teachers meet as subgroups regularly in every two weeks to discuss about a particular lesson plan they are developing consistent with their particular teaching area. While Kurt and Kristin were in a group that was dealing with multiple representations, George was in a group for proof in math, and John was in a group for technology in math area.

Based on my observation and information gathered from the website, in the second type of meetings, which are called LSG (lesson study groups) meetings, teachers generally spent 30 minutes for a general discussion about the next week's agenda. Then, they grouped in their LSG groups- multiple representation, proof, or technology groups, etc. to elaborate a lesson plan that they have been trying to form for long time. Their problems in their teaching experiences could also be a discussion topic if other teachers in the group were also interested in it. For example, when elaborating the lesson plan in proof group, one of the teachers, George, was addressing an issue that he considered to be important for his students - the lack of language level in math and, then, others continued the conversation by giving their own examples. This similar conversation seemed to show me that there could be some problems in teachers teaching practices that I should consider in my interviews later in the study. That definitely led me to put an additional question into the interview questions regarding what kind of problems that teacher can face in their teaching. In the following section, I will describe my main findings from the interviews of the teachers.

Why Are the Teachers in the Program?

When asked, the teachers seemed to have similar reasons for joining the program. Looking at lessons in depths, trying to be reflective on their own teaching practices, collaborating with other teachers, and doing pedagogical readings were the general reasons why the teachers got involved in the project. On the other hand, as a professional development, the program seemed to address other expectations of the teachers such as being given opportunity to go to conferences, do academic publications, and use pedagogical resources and technological equipments that the program can provide.

What Do the Teachers' Teaching Practices Look Like?

The followings are the main teaching events and issues that the teachers had interesting points and

strategies about. Thus, I do not necessarily mention about each of the nine events here. Rather, in the conclusion part, I put a table that describes all of the activities that the teachers carry for each event as a summary.

Gaining Students' Attention: The teachers mentioned questioning, making announcements about the lesson plan/objectives, starting with high level of tasks, or presenting a problem, as the main ways for grabbing students' attention. In many instructional tactics challenging students with questions is one way to get students attention as seen in teachers' explanations (Dalton, 2003). However, one of the teachers, Kristin, seemed to be careful regarding presenting challenging question.

In the past, I tried to do things like here is an attention-getting problem "here you work here and I work". It was kinda frustrating.

In many learning situations if students are left alone in a given challenging question, they may become frustrated. It is a concern that both Kristin and Kurt pointed out. Regarding challenging question, Kurt continued with another point, student achievement level:

They should have a background to figure out when doing problems. I do not challenge my lower level students.

In a similar way, George mentions about challenging students in relation to their levels:

I can say it is hard, I have a couple of students in second year cal[culus] that are really difficult…. To challenge them plus keep the class going is tough, because I can develop my class period if you are doing things that they are capable of doing and that's kinda hard. It is tough to have the appropriate thing for every student.

As seen in George and Kurt explanations, students level could be a problematic situation in which low level of student are more likely to get stressed when confronted with a challenging problem. On the other hand, high level students are believed to get benefit from it. As George noted, it could be really difficult to address issues tailored to every student. Especially when the class size is considered, posing challenging questions to the students might not be a preferred option for teachers. Hargreaves and her colleagues (1997), examining the class size and student-teacher interaction, observed that challenging questions, which students need to give more reasons to answer, are often used in smaller classes. The bigger the class size, the more likely it is to have different level of students and the less often teachers ask challenging questions. The ideal way for such as situation like this could be to try to find out a middle point of "how often" to use challenging questions or to figure out other ways.

Rather than starting with a question, Kristin suggested another way, which is not directly targeted on gathering attention but on keeping students' focus in a meaningful way.

I have a folder for them, they go and check that so they are busy organizing their binders firstly, they are required to keep a binder and it is separated into sections like handouts and notes homework and quizzes and tests, they have these sections and they go to their folder, you know, they have things to do, they know that that is expected so they bring it back and sit down and organize it and whatever it says, they need to do that point too.

Keeping students busy in doing some sort of tasks was seen as another way of maintaining the students focus by Kristin. Maybe, this is not something that grabs students' attention directly but something that warms them up before the class starts. On the other hand, this is not to say that starting with an interesting and challenging question will always cause to frustration among the students. As long as students are given chance to think and discuss about the question, it may be still possible to stimulate students' thinking. Those students who can be stressed by teachers' challenging question may have more effective discussion if they are given chance to collaborate with each other. Maybe, putting students in pairs and letting them discuss about the question will work well in leading students to have focus and pay attention to the class flow as another teacher, George, did. Talking about how he kept students attention level high, George went on:

I actually question them to ask their partners to respond their partner or " here is something I would like you to work on for a few minutes" so they do not have long periods of times whether or not doing something.

But again, without enough help and resources, students even in groups can feel frustrated. Students

confronted with bunch of information and problems to solve without any adequate resource, can be in trouble. Kristin, trying to describe the ideal challenge, addressed this issue:

To me, I guess the ideal challenge is not just pushing information on them but helping them learn the information. I never ask them to, "ok put away your book and do not look at that" [instead] "Use all your resources" you know and to set up a challenge in that way that you [students] always have resources to use. So, "use what you have" and " use somebody sitting next to you, ask some questions you do not understand".

It seemed to Kristen that attention gathering is not necessarily to ask students something interesting and challenging that directly grabs their attention, but to keep students focus in a meaningful way, which could be in the form of asking students to organize their folders, discuss in their groups or pairs, or so forth.

Stimulating Recall of Prior learning In many subject matters, understanding a concept is very important learning outcome like in mathematics. Understanding concept is not just to describe something as a concept but rather to see the concept in relation to others and to be able to perceive how it behaves in different unfamiliar situations. To understand, it is important for the learner to make connection between the newly acquired knowledge about the concept and the already acquired prior knowledge in meaningful ways (Reigeluth, 1998). Through these connections, the learner is able to see where the "new" fits into "old" ones, consequently, understands the concept meaningfully. In cognitive theories, this process is defined as assimilating new information to existing knowledge structures and accommodating these already structured knowledge units to the new information as necessary. Thus, it is important to have agreeability between the newly coming information and existing knowledge unit in mind is important. When learners get exposed to information units similar to those already structured in their mind, it is easier to activate these already structured units (Winn, 2004). In other words, showing relevancy of new information seems to help process and make sense of the information for learners.

When teachers were asked about their ways to help students recall their prior knowledge, the main ways they described were (1) reminding students the prior knowledge as necessary before or during teaching a new topic verbally or on the board and (2) having students memorize information from prior classes.

John and Kurt had the same way that they just go back and review the materials when they think that there is a weakness in students' understanding of the new topic. It seems that time spent in stimulating the prior knowledge is pretty limited especially when the students are not able to recall the "old" knowledge well and there are many new topics to be covered in one lesson. Kristin, when talking about recalling prior knowledge, continued that:

Within the range of the students we have in one class that some, of course, recall and you know that's the hard part… we have some [students] that do not recall at all, they do not remember. When you start a new instruction, [you say] "here is your path on the back what we did before, you remember those" and through that, "o yeah o yeah" like all start going often and you just do the best you can with that and then lead them slowly into a new topic.

On the other hand, mostly, students are expected to recall what they have already learned. George, explaining his way of stimulating prior knowledge, mentioned that:

I have them memorize quite a bit, they have to know the statement or some theorems. I mean I try to tell, " you need to know the exact languages or you need to be able to talk about the ideas on this theorem". My point to them is "well, it's just like learning speaking a language, you have to be fluent, and you have to know the vocabulary".

Even though George had a good point in knowing certain aspects of prior knowledge in understanding new ones, he did not appear to provide certain ways of helping students recalling the prior knowledge pool other than having them memorize.

Kurt noted another issue in recalling prior knowledge. Even though he said that he reviewed some materials as he felt that students needed to recall, his expectation from high-level students was pretty different than from the low ones:

I teach two honor classes. I expect them to know certain things and often I am disappointed because they do not recall what I hope they do.

It appeared that he was more likely to review materials for low level students because he believes that high level ones can remember and know some certain aspects already but in fact, often "they do not recall" either as he mentioned his disappointment.

Presenting the Stimulus Learners are supposed to get exposed to certain types of information in order to make sense of it. This event is mostly where the students are given the information presentation in variety of ways

(Aronson, 1983). Verbal information, demonstration, visual means, and others are the general ways for presenting a concept, examples, and relevant supportive information.

Drawing on the board, verbally given examples, problems, use of video and some basic computer applications for visual representations were the main ways which the teachers mentioned for presenting stimulus. However, there were some points that the teachers made in terms of how students could have problems with a given stimulus. One big issue that George was concerned with is the complexity and importance of language level in math. He said:

> One problem that they have I am convinced is just the language level in math…… I mean I have students that can read a book read a page in an English class and it's a full of details too but they can bluff it by not having to read that quite everything in English. I mean, in math, it's so much more compact in that things really matter, you have got to know every word in a sentence and what it means, there is a lot of language issues.

As George pointed out, the first matter for students is to know the "every word" to make sense of the "sentence". Maybe the ways in which information is presented is important but it seems that it may not matter for students to see the information in different forms if they do not have the certain prior understanding of that information.

Scared of Math? When talking about problems that students can face in math, teachers were aware that students may have negative feelings about math. According to the teachers, unsuccessful math background and lack of confidence were the main reason. George perceived feeling lack of confidence and feeling hesitations as a part of bad interaction between students and teachers. He went on:

I think a lot of teachers are open to questions… well, I answer any kind of questions,…. some teachers would talk about, you know, "students are asking dumb question or stupid questions" ….. if you asked me a question in math what 3+4 is, I would tell you in a strait face…. I want them to really feel like that they can ask me anything in math.

He had the same remarks when suggesting that:

> I know that again, it's deadly if the teacher says " if you had listened to me, you would know it, you did not listen". I think, we have to avoid this [kind of remarks]…… I think we have a lot of [this] kind of things going on and that makes students reluctant to ask because they do not wanna ask [at all].

In addition to attributing lack of confidence to the bad student-teacher interaction, George also viewed the interaction among students as another reason for a negative attitude about math.

> ….if they judge the smartest person in class, maybe then they might be thinking that "I am the dumbest person in the class" They all are very good but rank themselves, you know, for good or bad. I think some do like competence.

Examining the opinion on one's own confidence based on the belief about other people's ability, Wagner (1984) found that one's confidence gets higher if a superior other (in ability) is perceived to agree with him whereas the confidence becomes lower if a superior other disagree with him. In other words, a student can feel less confident in a classroom setting if he thinks that there are some other better students who would disagree with him when he talks. Bandura (1997) notes that observing or perceiving others in their ability to carry on a task creates a vicarious experiences, which contributes to the ones own beliefs in whether he can carry the same task as well. Likening self to others in terms of ability, accordingly, can be helpful for one to complete a task as long as others are perceived successful in completing it. On the other hand, if one lowers his perception about his own skills and sees those, who successfully complete tasks, superior to him, then, the vicarious experience would not benefit him. In fact, it would create negative feelings and lead to lowering expectations about his performance on a given task.

Kristin, on the other hand, made another point in explaining why students may have negative attitudes toward math. She believed that parents' thoughts and experiences on math affect students' confidence about math. Based on her conversation with parents, she commented that:

> At home, they [-students] are told that " I can not help you with this homework I do not understand math" and parents tell them right a way that it is ok not to understand it and you know "I am afraid to try to look at it with you" so I think they are discouraged, some of very early age.

This might be the same thing as verbal persuasion that Bandura describes (1997)in terms of how one's

belief about his ability to carry on a task can be affected by others' ideas, encouragement, or discouragement about the person's potential performance. In this case, parents' beliefs about their own low ability in math and consequent low expectations of their own kids' ability might serve as a discouraging factor for kids to develop confidence in math.

Kristen also talked about family meetings in which teachers introduce short class sessions to parents. She sees this as a way of changing parents' perceptions about math, consequently, helping students not have negative attitudes toward math:

This is our third year, in the first year we had 30 parents and students come, last year it's about 120, this year 300. So, what they do is that we have teachers' teaching 25min. session using graph and calculator, there are simple things, using GEO boards, origami. Parents are terrified to come, you see them when they walk in the door, we have pizzas, we talk to them a little bit, in the end, they all just smile.

If parents' perceptions are really considered to be influencing their kids perceptions about math, these meetings really seem to help parents and students respectively.

The Program's Contribution to the Teaching Practices

After talking about their teaching practices, the teachers were asked whether being in the program contributes to their teaching practices. It seems from the teachers' comments that the program influenced teachers' teaching practices in a broader but not direct way. They see the program as an opportunity to collaborate with other teachers, do lesson plans elaborately, do pedagogical readings for their own instruction. When talking how the program affects his way of teaching, Kurt emphasized that :

I think the program has not necessarily influenced how I assess, how I present, or how I communicate [with students] but it is all in there together. It makes me concentrate on certain aspects of my own instruction.

For one of these "certain aspects " , he added that:

I am in the multiple representation group and I have found myself trying to include multiple representations of algorithmic relationships. I think, it's important for students to see relationships in multiple ways because they are not gonna understand [the relationships in] one way.

Kristin also noted how her teaching practices became different as a result of joining the program: ….there are three multiple representations that I used and I really think it helped. By the end, the kids are saying " oh I know how to do it in algebraically, can I just write it all out"…. Before I have not thought about doing these three things, I was just struggling to get them to write it out in one of the ways. You know, they would just make statements like they would put –2 and –2 on each site rather than writing a new statement that is actually new something mathematically. So they are begging me, "I am ok with this, do I have to draw it anymore?, I just wanna write it all out", and then, I am like " you just want to write it out, ok, that's fine".

Based on similar comments, it is pretty obvious that the program affected teaching practices of the teachers by not only enabling teachers to focus on specific elaborated lesson plans but also encouraging teachers to promote different multiple ways for students to understand and learn. The teachers also agree that the program contributes to their professional development by giving opportunities such as going to conferences, using technologies and resources in their classroom etc. On the other hand, there are some suggestions that the teachers made how meetings could be enhanced. More reflective and interactive discussions are what the teachers would like to have. Regarding how group meetings should be taking place, George noted that:

I think I like that we talk to the whole group a little bit about what our small groups are doing because I feel like I want to share with everybody what we were talking about in our proof [group] like " we are trying to get this theme of justifying more often in class"…. In proof [group] we have got something to start to share and the multiple representation group talked about specific lesson plan but when we ask that they said something, they did talk about what kind of their overall goal…. I enjoyed doing that, but I like to have some chances to hear some more things that may have impact on all the teachers.

It seems like the subgroups of the program, even though they are active within their own groups, need to "be heard" and need to "hear" in other subgroups as well. More feedback from other groups is something Kurt would like to have:

I would like to get more people speak on what we are doing in our sub groups…..I wish that there were ways to get people to give me more feedback on my teaching practices…… the more feedback I can get on what I do in my classroom, the better teacher that would make me.

Enabling teachers to communicate with each other more and provide with feedback necessarily seems to be a good point that the program needs to take into account. Leading the teachers to use communication tools such as online discussions could be one example as George mentioned with regard to an existing discussion tool [ILF]:

There have been times that [ILF] was used effectively but for whatever the reason, we have not used ILF resources in terms of the facility to work on a common document or the chat. I thought it would be worth trying to some time to have discussion online but we have never done that.

Conclusion

In this paper, four high school mathematic teachers' teaching practices and their professional development experiences' contribution to these practices was documented. Not only the professional development program was expected to benefit from this documentation but also many educators, such as instructional design and theory developers were assumed to learn from these teachers teaching experiences.

For the Program

It is obviously seen that, the teachers' initial expectations are pretty met with the support from the program. Collaborating with other teachers in meetings to discuss lesson plans in details, doing pedagogical readings for their own instruction, providing feedback to each other, being reflective about the teaching practices, and being in a professional development are those the teachers expected to have and mostly were provided by the program. There are many ways that the teachers incorporate their experiences from the program to their teaching practices. Presenting students in multiple ways that were mentioned in the group meetings is one of the obvious direct pedagogical contributions of the program. On the other hand, there could be some ways to improve the program as a better professional development. (1) Having more and easy discussion environments among the teachers such as those online communications and (2) providing more constructive feedbacks not only within subgroups but also among the groups are the main ones noticed by the teachers.

For Educators

Regarding the teaching practices, it seems that there are many similar and different ways that teacher applies in each nine events of instruction. In addition to that, there some issues that the teachers pointed out for implementation in some of the events. Below is a general table that describes the strategies applied and important issues considered by the teachers in these nine events.

Table1- *Teachers' Ways in Each 9 Events and Possible Corresponding Issues*

Events	**Teachers' ways in events**	Issues mentioned
Gaining attention	➢ Questioning ➢ Announcements ➢ Starting with Problems ➢ Starting with High level of Tasks ➢ Listing Objectives ➢ Yelling etc. ➢ Keeping students busy and focused on certain tasks ➢ Putting students in pairs and letting them discuss	Students can get frustrated when confronted with a difficult questions or high level of tasks.
Informing learners of the objective	➢ Announcing verbally ➢ Written objectives on the board ➢ Written objectives in handouts	It may take too long so there may be not enough time to start and go on the new topic.
Stimulating recall of prior learning	➢ Reviewing necessary prior information ➢ Verbally reminding students the prior knowledge during or before the presentations of a new topic ➢ Having students memorize prior knowledge and expecting them to recall ➢ Providing resources to students as much as they need	Students have to have necessary prior knowledge but it might be hard for them to recall everything.

Presenting the stimulus	➢ Using Visual tools (powerpoint, graphics, drawing on the board, graph calculator, etc.) ➢ Using Numerical Representations ➢ Giving students enough time and Letting them discover ➢ Giving examples and problems	Students may have different preferences regarding the teaching way –structured Vs less structured lesson Students may have problems when being exposed to stimulus and trying to make sense of it at the same time
Providing learning guidance	➢ Providing handouts, ➢ Giving more examples ➢ Re-explaining points made in books	Not mentioned
Eliciting performance (Practice)	➢ Problem solving after each concept or before the class is over ➢ Encouraging students to solve on the board	Not mentioned
Providing feedback	➢ Showing students their own mistakes rather than showing the all solutions. ➢ Using positive reinforcements (e.g Mc Donald cards) ➢ Asking students to provide each other feedback in group work	Not mentioned
Assessing performance	➢ Questioning students for their response ➢ Controlling homework and journals completions ➢ Doing Quizzes, tests, etc.	Not mentioned
Enhancing retention and transfer	➢ Putting things in tests from prior class sessions ➢ Asking students to take notes, ➢ Making connection to previously acquired knowledge through reviewing and reminding ➢ Giving Homework	Not mentioned

Among these nine events, gaining students attention, stimulating recall of prior learning, presenting the stimulus are the ones that the teacher seemed to focus on more. Teachers also have different types of strategies and problems that they can encounter in each event. According to the teachers, challenging tasks as a way of gathering students' attention could be problematic depending on the level of the students. Also the lack of resources to use in solving these challenging problems could be frustrating for students. On the other hand, regarding the stimulating the prior learning, students may be expected to recall instead of being help to remember. This sounds problematic if they are only expected to memorize and be "fluent" because like in many subject matters, understanding concepts heavily depends on the connections that the student can make between what he is learning and what he has already known. Presented the stimulus, students may have problems in both trying to take notes (being exposed to the stimulus) and trying to understand what the stimulus means. Even though they have a chance to review the notes that they take later, it may be hard for them to understand something that they did not in class. Another issue in this event is the preferences that students may have for their learning styles. For those who "resist" discovery approach, using more structured information presentation may seem to the teachers as a good strategy but in this case, those who are willing to "discover" are not given the opportunity to discover. The ideal way, as emphasized in the interviews, could be a combined approach in which students are exposed to both discovery and more structured ways of learning so that everyone, at least, can have a chance (to some degree) to learn in way that they prefer.

The teachers also mentioned the reasons of negative feelings that students might have toward math. Lack of confidence due to lack of positive feedback from teachers, seeing other students superior to self, discouraging prompts from the teacher, and low expectations that parents have about their kids' performance were perceived as main reasons. More caring and positive communications between teachers and students and more encouragement from parents about the students' performance are the ways that the teachers perceived to handle the students' negative attributions to math.

As George mentioned, "*it is tough to have the appropriate thing for every student*" but it is always worth trying to have multiple ways and necessary communications to approach the students in a caring, motivating but not discouraging ways so that their learning can be enhanced by letting them go beyond their possible fears and learning obstacles.

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