



## Student(s) Out the Front: Variations of a form with different functions

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David Clarke: "Kikan-Shido: Between Desks Instruction"

Ida Ah Chee Mok: "Learning Tasks"

Joanne Lobato: "Guided Development"

Yoshinori Shimizu: "Matome: Summing Up"

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## Introduction

The international research team of the Learner's Perspective Study has started to document and analyze the differences that seem to exist in the enactment of particular lesson components as documented in this symposium. Such a study promises to clarify issues related to the following questions:

- Are there classroom-specific forms or culture-specific forms of realizations of similar functions?
- How are the forms of physical set-up, interaction and talk linked to the structure and quality of the tasks?
- Which modes of learning/ teaching do distinct forms constrain or afford?

The function according to the teacher's intention does not necessarily match the function the majority of students or an observer would accredit to an activity. In addition, without further analysis, nothing can be said about the extent to which the purpose of the activity is achieved.

For this study the event "Student Out the Front" has been chosen for the following reasons:

It occurs in all the classrooms from the LPS and there seem to be forms of this activity that are peculiar to learning and teaching mathematics in classrooms at school. The definition of this lesson event is a reminder that classrooms show some commonalities in shape and physical layout. Classrooms all have a back and a front; the front is the side where the teacher's desk and chair, the board and/ or a screen are located. The forms of physical set-up afford distinct types of interaction while at the same time prevent others. For example, group work commonly involves a re-arrangement of chairs and desks. The extent to which the students and teachers shape or acquiesce to the set-up of their classroom varies.

Most of the learning and teaching in the LPS classrooms takes place when all the students sit at their desks and the teacher stands in front of the class or walks between the students' desks. There are no activities that include a student sitting at the teacher's desk; a teacher sitting at one of the students' desks is extremely rare.

## Methodology

The following definition was used:

Student Out the Front:

One or more students are in the front of the classroom – this is usually the side of the room on which the board, an overhead projector (OHP) or the teacher's desk is located. The student(s) may, for example, be writing something on the board or on the OHP, talk or give a

demonstration using a model. A student cleaning the board does not count as an example of this lesson event. The event starts when the teacher announces the activity and ends when the student has taken her seat.

The events were identified in the video footage and then the relevant parts of the transcripts were selected. This paper reports the variety of functions of this form in six classrooms from Germany, Hong Kong and the U.S.A, which are labelled G1, G3, HK1, HK3, US1 and US2. These classrooms were chosen for a detailed study of forms of interaction and talk. The selection of the distinct classrooms is based on the principle of maximizing contrast but at the same time keeping a reasonable basis for any study of variations, which presupposes a similarity in at least some aspects. This strategy, which is different from the sampling principle of the LPS but can be applied to the sub-sampling, is reasonable because the present study is based on a theoretical perspective, which already is the consequence of a first round of data analysis. In order to document the students' and the teacher's perceptions and intentions related to the event "Student Out the Front", the interview data were searched for the parts in which the participants refer to this activity.

#### Functions of Student Out the Front in the classrooms under study

##### **HK1, lessons 1-10 (lessons 09-18 in the original data set)**

Lesson	TimeIn	TimeOut	Description
1	21:27	30:41	The teacher asks several students to write their solutions on the board, while the rest of the class continues individual seatwork on the tasks. The students work in parallel and sit down when finished. The teacher looks at the results and asks some students to come back to the board to fill in steps they have omitted or to correct other mistakes.
3 (1)	14:12	20:05	Two students write their solutions on the board while the others continue individual seatwork. The student at the board is engaged in private talk with the teacher.
3 (2)	28:13	32:48	One student volunteers to solve a task immediately at the board. The others solve the task in individual seatwork. The teacher later cleans the board without commenting.
3 (3)	49:50	50:14	One student writes a solution on the board while the others continue individual seatwork and the teacher walks between the desks. Later the teacher writes the answers on the board.
5	05:47	13:55	Different students write different results of the same equation on the board. The teacher refers to the variety of results in his explanations.
6	09:01	14:12	One student constructs a graph at the board while the other student do the same in individual seatwork.
9 (1)	33:40	36:04	One student writes his result on the board while the others continue individual seatwork.
9 (2)	37:10	39:20	One student writes her result on the board while the others continue individual seatwork.

## Functions

1. An extra chance for getting the teacher's comments: *If you don't understand, he would teach you. That's quite nice.*

In most of the events the students are writing their versions of solutions on the board within a period of individual seatwork (lesson 1, lesson 3 (1) and (3), lesson 6, lesson 9 (1) and (2). This could be perceived as a way of publicising the results in order to share them. However, it is not clear whether the students perceive this as an act of addressing the whole class. They do not speak while writing on the board and the other students usually continue with their individual seatwork without paying much attention. The teacher does not always check the students' work immediately. In lesson 1 some students are asked to come back to the board and to correct their work.

It is indeed not the perception of the teacher and the students that publication for the sake of sharing with the whole class is the aim of writing their answers at the board in these events. It is rather sharing the solution with the teacher:

(HK1intT1, 365-367, 397-400)

T: They know that I am very kind so when I go around, they would ask me if they don't understand. Also, they are familiar that every student has a chance to come out and write out the answer.

Int: Usually they come out voluntary or you call their names?

T: Mm... their habits are coming out themselves. well, because em... although some students were not taught by me previously, they have already adapt my habit in this half year.

Int: Mm.

The purpose of helping individual students with their work also is reflected in the teachers statement in lesson 1:

(HK1-L01)

31:53:00 T: If you get it wrong, check each step to see which step is wrong. I'll call the one who is not answering the question to do it on the blackboard. Don't do other things. [T walking around]

The students' practice does not necessarily involve comparing their own work with the solutions written on the board by their classmates. Some students chose to do so; many do not.

Peggy (HK1-L01, 149-163)

Int: Have you checked the answers of one to eight on the backboard?

Peggy: No.

Int: No.

Peggy: Uh.

Int: Was Mr. M. correcting the answer of the student, wasn't it?

Peggy: Yep.

Int: He corrected the answer like this, have you checked whether you also did the wrong things like them?

Peggy: Mm, I had checked with the book. The answer was correct. Uh, Mr. M... would walk every row afterwards, if we did not understand, we could put up our hands. He would teach us.

Int: Will you put up your hand if you did not understand?

Peggy: Uh, I would discuss it with my neighbors around me first.

Int: Discussion with them first?

Peggy: Yep.

Peter(HK1-L05, 40-45; the student is not referring to the event in lesson 5, but gives a general description)  
 Int: It's all right. Do you think the way that you learn mathematics in the last lesson the best?  
 Peter: It's okay  
 Int: Well... Why do you say so?  
 Peter: Because Mr.... Mr. M. gave us the questions and put them on the projector. Then he let us do them. I think that's quite good. And then, he calls us to answer them (on the blackboard). If you don't understand, he would teach you. That's quite nice

Rose(HK1-L09, 118-130)  
 Int: What did you do at last?  
 Rose: I looked at Rebecca's answer, the one em... on the blackboard, but I didn't understand why was that so. Then I looked at it carefully. I looked at the two equations on the top and found that Au mixed the first equation with the second equation.  
 Int: You mean equation 'x plus y equals five hundred' was mixed with the equation about percentage?  
 Rose: Yes.  
 Int: Is Rebecca your neighbor?  
 Rose: She was sitting in...one two three four...row four.  
 Int: How could you borrow her notes while sitting that far away from her?  
 Rose: No...she was writing on the blackboard.  
 Int: She was writing on the blackboard...//oh...you looked at her equations and you thought about them.

## 2. Solving a task in public

In the other events (lesson 3 (2), lesson 5) the students' work on the board is integrated in a period of whole class instruction. In these cases the students' solutions get the status of being public. In lesson 6, the graph constructed by one student at the board becomes a public object of discussion later in the lesson. In both events the students are engaged in a task or parts of a task that they have not completed before they work at the front. The sets of related tasks have the status of a "Learning Task" (cf. Mok, this symposium).

### HK3, lessons 1-10 (lessons 05-14 in the original data set)

Lesson	TimeIn	TimeOut	Description
7	30:45	35:25	One student volunteers to go up to the board. She copies her solution from her notes. The teacher talks to individual students.
8 (1)	16:00	17:14	The teacher puts the pen for the board on a desk and claps his hands. One student goes to the board and writes the solution. The teacher talks to individual students.
8 (2)	17:14	20:25	One student points to another student sitting next to her. The latter writes her solution on the board. The teacher talks to individual students.
10 (1)	13:45	16:48	One student is solving a task on the board after the teacher tells her to do so. The teacher continues to walk between the desks.
10 (2)	18:24	20:27	One student writes her answer on the board after the teacher has handed her the pen over.

### Function

#### An extra chance for getting the teacher's attention

The function of all these events seems to be similar to the first function in HK1. While the whole class is engaged in individual seatwork and the teacher walks between the desks, he occasionally

hands over the pen to a student who is then to work on the board. Then teacher continues walking between the desks and talks to individual students monitoring and guiding their work. The students do in general not pay attention to the work of their classmates on the board. For example, the handwriting of the student in the event in lesson 7 is very small; it is unlikely that the other students can even read it. The students and the teacher of this classroom do not refer to the function of the activity “Student Out the Front” in the interviews.

The following part of the lesson transcript gives an impression of what is happening at the students’ desks while one student is out the front. The language of instruction in this classroom is English. However, when the teacher and the students talk at the desks, they switch into Cantonese. This is another indicator of the importance of non-public talk in this classroom. If the conversation is in English, this can be taken as a reasonable indicator for its status as public talk.

### HK3-L07

00:30:44:03	T:	[to Janet] Okay, okay, I've not tried this for a long time (...)[in Chinese]
00:31:03:25	T:	[to Joyce](...) Then for here... add them together... no, subtract this...
00:31:12:23	Judy:	It's four point five. [in Chinese]
00:31:14:07	Joyce:	Ha, clever. [in Chinese]
00:31:14:17	Judy:	Oh yes... [in Chinese]
00:31:17:05	S:	Subtract the smaller values from the greater one... [in Chinese]
00:31:23:25	Janet:	The difference is too great... I can't write... [in Chinese]
00:31:30:07	T:	[to Janet] Hey, why would you write the answer first? (...) [in Chinese]
00:31:31:21	Janet:	No! I've forgotten to erase these three again... haha... [in Chinese]
00:31:42:27	T:	Hey they didn't ask about buying... [in Chinese]
00:31:47:25	Janet:	You kidding? How much... [in Chinese]
00:31:49:23	T:	A? It's not... [in Chinese]
00:31:50:25	Janet:	Cost... it's not like that (...) [in Chinese]
00:31:53:27	JULIA:	[to JUNE] They're doing the fifth question, aren't they? Then have you finished it?... What's the answer? [in Chinese]
00:32:00:17	JUNE:	Yes? Yes!... [in Chinese]
00:32:04:05	T:	I thought that you (...) the two-digit number (...) The two digits... their difference is ten, the two digits...the sum of the unit place digit and the tens digit is ... [in Chinese]
00:32:28:05	T:	If a number is... a number... for example, a value is twenty-eight, then (...) if these two digits... [in Chinese]
00:32:39:29	T:	If these two digits are interchanged, this two-digit number...the new values is greater than the old one by three. [in Chinese][in Chinese]
00:32:52:09	S:	Sir, I don't know (...) if the equation is correct... [in Chinese]
00:32:54:07	JACK:	[to JAMES] No... [in Chinese]
00:32:55:24	JAMES:	You subtract... four minus three... ten y minus six y equals four y... four y equals five... then four minus foorty-two... then it's... [in Chinese]
00:33:06:27	JACK:	Then why... why would it equal this plus (...)[in Chinese]
00:33:12:13	JAMES:	If...this plus this is twenty-four x plus sixteen x... [in Chinese]
00:33:16:06	JACK:	It's not like this... expand these denominators (...) [in Chinese]
00:33:19:07	JAMES:	Yes. [in Chinese]
00:33:19:27	JACK:	Then (...)[in Chinese]
00:33:24:09	JAMES:	Yes, you can... [in Chinese]
00:33:26:03	JACK:	But... [in Chinese]
00:33:27:13	JAMES:	It's alright! [in Chinese]
00:33:29:27	JACK:	Really? [in Chinese]
00:33:31:27	JAMES:	(...) You can't add... subtract... you've to subtract this side again. This is addition, this plus (...) minus... [in Chinese]
00:33:41:17	JACK:	Sir... it's about time... [in Chinese]

00:33:44:14	JAMES:	Nearly... yes...(…) [in Chinese]
00:33:49:25	JACK:	(…)
00:33:51:05	JAMES:	(…)
00:34:08:01	JACK:	These questions are damn simple... [in Chinese]
00:34:10:27	JAMES:	(…) These questions (…)[in Chinese]
00:34:13:29	T:	(…)
00:34:24:23	JAMES:	Sir, Gilbert is calling on you... [in Chinese]
00:34:27:09	T:	(…)
00:34:28:20	JAMES:	Sir... are you dumb? He's calling on you... [in Chinese]
00:34:38:23	Gilbert:	[to T](…)
00:34:38:09	T:	//(…)
00:34:38:19	JAMES:	[to S] //Yes, the nose just bled... (…)[in Chinese]
00:34:41:07	S:	Bled? [in Chinese]
00:34:42:15	JAMES:	It's okay now. [in Chinese]
00:34:48:09	JAMES:	You're right (… ) after lunch (…)[in Chinese]
00:34:53:23	JACK:	(…)The water fountain (…)[in Chinese]
00:34:59:03	JAMES:	(…)
00:35:00:25	JACK:	(…) Leave it for tomorrow... [in Chinese]
00:35:03:03	JAMES:	(…)
00:35:05:25	JACK:	I've done it. [in Chinese]
00:35:19:01	JAMES:	(…)So clever pig, good job good job...Not pig?

### G1, lessons 1-10 ((lessons 05-14 in the original data set)

Lesson	TimeIn	TimeOut	Description
5	04:31	07:28	Four students are writing the results of their group work on the board. The teacher walks between the desks.
6	37:48	45:01	Three students construct drawings that they have been producing in their group work at the board. The teacher walks between the desks. One extra student assists for a short period.
7 (1)	02:20	08:10	Seven students who are delegates of three groups draw a geometrical interpretation of three binomial formulas on the board. The teacher watches them and talks to some of them.
7 (2)	08:35	13:10	Two students explain the drawings from their group to the whole class [geometrical proof of $(a+b)^2$ ]
7 (3)	13:50	23:40	Two students explain the drawings to the whole class [geometrical proof of $(a-b)^2$ ]
7 (4)	23:40	30:07	Three students explain the drawings to the whole class [geometrical proof of $(a+b)(a-b)$ ]
7 (5)	33:18	34:26	One student gives additional comments on the work of the last group, prompted by a question from the teacher

### Function

#### Publicising and explaining work

The events documented in the table serve the purpose of presenting work in order to share it with the whole class. A pair or group of delegate students of a group are asked to present results from group work. In the lessons that are not part of the shared data set of ten lessons, single students are asked to present work completed in individual seatwork at the board. This has a similar function. The students give explanations and sometimes ask the other students whether they understand. All the examples given here refer to group work. However, group work is rare in this

classroom according to the information given by the students in the interviews. The ten lessons are in this respect not typical for the practice in this classroom.

The teacher does not check the students' work from the groups in lesson six before the students are asked to present it in lesson seven. The whole lesson is devoted to the presentations and the students are involved in a discussion with their peers out the front. However, the teacher takes over and switches from monitoring the discussion into a mode of "Guided development" [in German: Fragend-entwickelndes Unterrichtsgespräch, literally: questioning-developing classroom talk]. This can be seen in the following lesson transcript, which refers to the second event in lesson 7.

### G1-L07, (2)

Task: geometrical proof of  $(a+b)^2 = a^2 + 2ab + b^2$

It has been solved in group work in the previous lesson. Simone and Clarissa are the focus group students in this lesson

00:08:18:24	T	It's all right now, well as not everybody has been doing the same now, it would be sensible if those who haven't worked in that group now would well take some little notes on it, so that they may follow it as regards content, and it's also going to be the case that two representatives each or one or it all depends come to the front and then again (?) now explain, right, and because it was Günther's turn for this first binomial formula here, so it would be nice, if now Günther could briefly explain that here, what that is composed of
00:08:53:20	SIMONE	(?) it's all right
00:08:55:15	Günther [at board]	Well
00:08:56:16	T	Do come to the front
00:08:56:29	P	Go to the front
00:09:00:02	Günther	Well this had also been in the book like this already and it may be explained by, well after all we have
00:09:05:04	P	Tsht
00:09:07:06	Günther	twice
00:09:08:04	P	Günther don't stand in front of it like that
00:09:10:00	P	Oh God
00:09:11:01	P	Stop that now, be quiet for a change and let him explain
00:09:13:22	P	But you can read it, or can you read it
00:09:15:09	P	If you're standing in front of it
00:09:17:27	P	Right, okay(?)
00:09:19:01	P	Why don't you just be quiet now?
00:09:21:01	Günther	Well a squared results from the one line a and the other line a, now some will maybe ask themselves we've actually got yet another line a here and yet another line a here, but we may that's how it was explained to me leave out these in principle,
00:09:36:19	P	Er?
00:09:35:05	Günther	because of this to the power of two, because we've got that already
00:09:38:23	P	Yes
00:09:39:08	Günther?	Is that correct or has that been explained to me wrongly?
00:09:41:16	T	Erm, yes I don't understand you, well there at the top there is actually no line a after all
00:09:47:20	Günther	Yes exactly, that's what I mean, that's what I mean
00:09:52:14	CLARISSA	Mr Rauscher, may I join in explaining this?
00:09:54:12	T	Yes, please
00:09:57:01	SIMONE	Bye-bye
00:10:02:19	CLARISSA	Well this square is composed of, well it has two sides here each where it's always a



		and b, and then if you a plus erm well erm well the area is then a plus b times a plus b and that's erm a plus b in brackets to the power of two and that's composed of erm that is then well that's just composed of these
00:10:24:10	P	That's clear
00:10:24:17	T	So another (?) maybe I can well has that been understood, yes,
00:10:28:06	P	No
00:10:27:21	T	That very large one, the very large square how long is each side there of the very large square, maybe you could say that again
00:10:37:20	P	a times b
00:10:38:29	P	a plus b
00:10:39:15	P	Er a plus b
00:10:40:09	T	a plus b each length of one side of the large square is a plus b and that and then as a result of that the area of the very large square?
00:10:51:10	P	a plus b squared
00:10:52:00	T	a plus b in brackets squared, that what's written on the left of the equation, right and now you may combine that out of these partial areas that's what you would have to explain again now
00:11:04:07	CLARISSA	Well so this a squared is this area here
00:11:07:26	T	Yes
00:11:09:03	CLARISSA	and two ab is if you erm well this here you've got that twice so two ab
00:11:16:24	T	Yes
00:11:17:17	CLARISSA	and then b squared is left well this on top here
00:11:19:23	T	Can you explain now, why this small area has got a times b as the area, on what, on what, how do you get to that
00:11:32:09	CLARISSA	Erm
00:11:35:27	Günther	Ah well for once the line a here
00:11:38:26	T	Yes
00:11:39:27	Günther	and once the line b
00:11:40:13	T	Yes
00:11:41:14	Günther	and both of them together result in the large one so four times
00:11:44:12	T	a plus b
00:11:46:03	Günther	the a plus b in brackets to the power of, squared
00:11:48:03	T	Yes
00:11:48:21	Günther	Right, so we have to add that together anyway now because of plus and so we get a and b, well that is in principle a plus b in principle
00:11:59:20	P	Well somehow I have that (?)
00:11:58:21	SIMONE	a times b
00:11:59:08	T	No, well my question was not quite concrete now, why is there in the upper small square written a times b, that is perfectly correct, I want to know why there's a times b written inside it
00:12:13:23	Günther	Yes
00:12:13:21	T	That's my question
00:12:16:25	CLARISSA	Erm I believe because, well this small (?) it's here if times b times b results in b squared, then this would have to this section here would have to be a a again and then you've got a times b here
00:12:30:04	T	Correct, so that's what kind of form, which geometrical form?
00:12:35:09	CLARISSA	This up here is that a times b?
00:12:36:12	T	Yes
00:12:37:25	CLARISSA	Well a rectangle
00:12:38:15	T	That's a rectangle. how long are the sides of this rectangle?
00:12:42:06	CLARISSA	Erm a and b
00:12:44:12	T	And therefore the area is?
00:12:45:23	CLARISSA	a times b
00:12:47:21	T	And that's why a times b is written inside it
00:12:48:09	CLARISSA	Yes
00:12:48:21	Günther	Yes
00:12:49:05	T	Okay, have we understood it now?
00:12:51:00	P	No
00:12:51:07	T	Fine and the same with the others and this is just being added then, and then in the

		end we get what later, Albert?
00:12:59:19	Albert	Erm a squared no rubbish
00:13:02:02	T	Yes
00:13:03:10	Albert	Yes a squared plus two ab plus b squared
00:13:06:26	T	Exactly, okay, so that has been understood now, yes, right, then er, or are there still any questions on this, then then do ask, if there's anything still unclear, everything clear, okay then we'll do the second group now, there we've got well we've realised internally already now that probably the second group had the most difficult task

The teacher and all but one student of this classroom do not refer to the function of the activity “Student Out the Front” in the interviews. The atmosphere in the classroom is not competitive. There is no indication that the students do not like to be at the front.

Clarissa, Simone (G1-L07, 64-70)

- J:           Hm...and when you normally go to the blackboard...well, when – when you are simply picked and you are not so sure whether you really know it, do you feel different then?
- Simone:    Actually, well, certainly not so confident anymore, //but//
- J:           //Hm//
- Simone:    I'm just trying it then, somehow.
- J:           Hm...you don't mind?
- Simone:    No.

### G3, lessons 1-10

Lesson	TimeIn	TimeOut	Description
1 (1)	09:29	10:22	One student is asked to find and write an equation on an OHP slide for a graph of a linear function that is shown on that slide.
1 (2)	10:52	13:13	One student is asked to find and write an equation on an OHP slide for a graph of a linear function that is shown on that slide.
2/3 (1)	20:38	23:01	One student is asked to present a solution from work in pairs at the OHP.
2/3 (2)	23:23	23:55	One student is asked to present a solution from work in pairs at the OHP.
2/3 (3)	23:56	25:20	One student is asked to present a solution from work in pairs at the OHP.
2/3 (4)	28:57	30:54	One student is asked to present a solution from work in pairs at the OHP.
2/3 (5)	31:04	31:52	One student is asked to present a solution from work in pairs at the OHP.
2/3 (6)	31:52	34:09	One student is asked to present a solution from work in pairs at the OHP.
2/3 (7)	01:15:15	01:19:15	One student presents the solution of a task solved in individual seatwork.
4 (1)	30:04	33:05	A student fills liquid into a model of a solid in order to find out the volume.
4 (2)	34:42	35:44	A student fills liquid into a model of a solid in order to find out the volume.
5 (1)	19:21	Not identifiable	One student solves a task at the board.
6	08:20	14:33	One student solves a task at the board.
7 (1)	05:11	06:07	One student solves part of a task at the board.
7 (2)	06:41	07:27	The student called upon does not want to go to the board and instead dictates the steps to the teacher.
8 (1)	25:37	27:28	One student solves a task from the homework at the board.
8 (2)	27:34	28:41	One student solves a task from the homework at the board.
9/10	01:20:01	01:24:02	One student presents the results from work in pairs at the board.

## Functions

### 1. Publicizing work

In this classroom, the students are frequently out the front. It happens in every lesson. Mostly this is for sharing work that has been completed before, be it in group work, individual work (2/3 (7), work in pairs (2/3 (1), (2), (3), (4), (5) and (6), 9/10) or as homework (8 (1) and (2)). Usually

the teacher is involved in the students' presentation by a form of guided-development that has the purpose of illuminating and explaining the students' work to the whole class. Consequently, the students do not talk a lot when out the front. This classroom is very small in terms of number of students and shape so that there is hardly a clear distinction between private and public talk because all conversations are audible by all participants. That means, even when the students intend to talk only to their peers, the other students or the teacher frequently get involved. On the other hand, it is impossible that the teacher talks privately to the student out the front, as for example in the Hong Kong classrooms. The weak regulation of interaction in this classrooms in terms of turn-allocation causes a high level of involvement, which includes arguing about coming out to the front. In the second event in lesson seven the student called upon refuses to do so and the teacher proposes to write on the board while the student dictates her what to write. This event is a case in point for the problem of identifying lesson events exclusively in terms of form.

## 2. Solving a task in public

In this classroom, students are also called to the front in order to solve a task or parts of a task within a period of whole class instruction, in which the tasks have the status of a worked example or a "Learning Task" (cf. Mok, this symposium). In this classroom, the tasks from the homework also happen to be new tasks to be solved in public for those who did not complete their homework. The comments from the students refer to this function:

Diana, Selin (G3-L02/03, 275-287)

Selin: Yes. I don't like it if you calculate on the blackboard. Rather on paper, then I like doing it. I don't know why but it is simply, I am prepared for that, I don't know.

J: Mhm. And, and you, how do you feel when you go up to the blackboard?

Diana: Well, it is really the way Selin describes it, that it is easier on paper because on the blackboard if you make a mistake.

J: What then?

Diana: I don't know. It's somehow embarrassing if you made a mistake when calculating or something like that.

J: And what is it like in your class, do the other laugh then or are they getting worked up?

Diana: Not in this course.

J: No.

Diana: Here it isn't.

Mona, Jasara (G3-L05, 217-261)

J: And does it also influence you that, how the other students behave that day?

Jasara: Nope, depends whether I had an argument with my friends or something like that.

J: I see.

Jasara: But otherwise no.

B: And ahem if Mrs. Mazzendorf had asked you to come up to the blackboard more often during the, during the lesson, would that have helped.

Mona: [Laughs] No.

J: Why are you shaking your heads like that, is it that bad if you have to go to the blackboard?

Mona: Yes.

Jasara: Actually it isn't,

Jasara: // but for example, I couldn't have done it because I wasn't listening.  
 J: // And why?  
 J: Yes.  
 Jasara: Well, then I would also have muffed everything, also on the blackboard.  
 J: And for you Mona is it, is it /  
 Mona: / quite bad, I don't like that at all.  
 J: (...) somehow say how you feel then, or why, why you don't like it.  
 Mona: Because then everyone can look at me, and I don't know, then they know exactly how I'm calculating or what I, what I'm thinking or  
 Mona: // I don't know, ... I've never done that, that I go up to the blackboard.  
 J: // Mhm.  
 J: Isn't it like that, that you have to, ... well if you  
 J: // nobody puts up a hand, that then someone has to go to the blackboard although he hasn't put up his hand.  
 Mona: // No.  
 Mona: Yes, sometimes it is like that.  
 J: It's also.  
 Mona: Then in fact she asks  
 Mona: // Mona, but nevertheless I don't go up to the blackboard.  
 J: // Then it can happen.  
 J: Then you simply say no.  
 Mona: Then I say no and then I don't care whether I get a 'six'  
 Mona: // or whatever. [The best German mark is 'one', the worst is 'six'.]  
 J: // Mhm.  
 J: Mhm and you don't do that Jasara.  
 Jasara: No, I, I go up to the blackboard, to the blackboard if she tells me to.  
 J: Mhm.  
 Mona: [Laughs]  
 J: Do the others laugh if you, if you don't know it or calculate it incorrectly.  
 Jasara: Most of the times they don't understand it either.  
 Mona: [Laughs] That is what it was always like at primary school, that is why I stopped going up to the blackboard.  
 J: There the others laughed about you?  
 Mona: Yes.  
 Seyfettin (G3-L08, 349-355)  
 J: // right, hm. ... And how do you like that, that you go up to the blackboard ... do you enjoy that, going up to the blackboard?  
 Seyfettin: // Yes.  
 Seyfettin: No.  
 J: Why not?  
 Seyfettin: Sometimes I get confused and I don't know how to calculate. Some problems seem so difficult because basically they are very simple.  
 Peer (G3-L09/10, 489-497)  
 J: Do you enjoy going up to the blackboard if there's something to do?  
 Peer: (...) don't enjoy it at all.  
 J: Why not?  
 Peer: No idea because (...) when you calculate something at the blackboard, then you make a mistake you always think that the others will laugh about you but actually it isn't like that in this course.  
 J: But you think like that, actually  
 J: // it's more in your head.  
 Peer: // It's more in your head but nevertheless. ... I've already been to the blackboard

### 3. Assisting the teacher in a demonstration

The events in lesson 4 serve a different purpose that might be similar to one found in physics classrooms. The students take over manual tasks, which are part of an experiment. In lesson 4, the class compares the experimental volume of solids with their estimation and calculation. The

students out the front fill coloured liquid into a model of a solid in order to find out the volume. The class watches and the teacher comments. The students in the interview refer to the event in this lesson but also to being out the front in general:

Ebru, Jasara (G3-L04, 230-253)

Be: Would you have liked to go to the front there too?

Ebru: No.

Be: Because of the cameras or in general?

Jasara: In general.

Ebru: I do not like going to the front that much.

Jasara: To the blackboard.

Ebru: Yes.

Br: And what about you.

Jasara: It depends how I happen to feel.

Br: Did you not feel like going to the front today or was it the task why you did not want to go to the front?

Jasara: It was a silly task, to fill in water with the jug ... not exactly the best.

Br: What do you think about the (...) in front there?

Jasara: Yes if I know something, so also how it works (...).

Br: Hmm.

Be: (...) actually this erm filling a body with liquid (...) you did not find this was anything you absolutely longed to do.

Jasara: Yes.

Br: But you do not like going to the front either if you know something somehow, that you might show what you can do.

Ebru: No, not if I am insecure, well here I would have again really, really if you just have to fill in water, I would have gone I believe, but if, if it had been any calculating thing where I am not quite sure, and I think that I can really do that properly, then I do not like doing that this much, I am afraid that I make a mistake

## US1, lessons 1-10

Lesson	TimeIn	TimeOut	Description
1 (1)	17:56	19:14	One student is called to write her solution on the board.
1 (2)	25:42	26:18	One student is called to write his solution on the board.
1 (3)	35:52	36:47	One student is asked to write his solution and to explain it.
1 (4)	41:53	44:03	One student is called and refuses. Another student volunteers and writes her solution. She is asked to explain it.
2 (1)	06:06	07:35	Five students solve five tasks of the warm up in parallel at the board (tasks 13-17).
2 (2)	16:43	17:50	One student writes her solution of a task from individual work on the board. She is asked to explain it.
2 (3)	22:41	23:45	Two students write in parallel the solutions of two different tasks on the board.
3 (3)	10:10	12:28	Five students solve five tasks of the warm up in parallel at the board (tasks 20-24). They copy from their notes.
4	05:14	07:06	One student solves one task from the warm up exercise at the board.
6 (1)	18:10	19:06	Three students write their solutions of three different tasks from individual work on the board.

6 (2)	22:48	23:29	One student is asked to share her version of a solution at the board because her result is different.
6 (3)	27:56	28:45	Two students write their solutions of two different tasks from individual work on the board.
6 (4)	39:37	40:41	One student is asked to share her version of a solution at the board.

## Function

### Publicizing work, explaining work

In this classroom, the students are frequently out the front. The function is similar to the first one in G3, that is, sharing work that has been completed before, be it from the warm up or from individual work. The teacher frequently comments the students' solutions for the purpose of illuminating and explaining the students' work to the whole class, sometimes in a form of guided development. In opposition to the teacher in G3, he does not do this while the students are still writing. The students do not talk a lot when out the front. However, in two events from lesson 1 ((3) and (4)) and one from lesson 2 ((2)) the teacher asks the students to explain their solutions to the class. Another difference to the practice in G3 is that there is frequently more than one student at the same time out the front. This avoids interference and comments by the teacher before the students have finished. Sometimes the teacher talks to individual students in this period so that the event becomes more similar to the version found in Hong Kong, especially when the tasks are from the warm up. In the interviews, the students do not very often refer to going to the front as an important event. The teacher does not try to convince students if they do not like to go to the board.

Alfonso (US1-L04, 271-285)

I Alright. Um, can I take you back to something you said about when you-when Mr. B. was correcting these, you were thinking about ... if you were called to the board.

Alfonso Mm-hm.

I Can you tell me about that, about being in a classroom, where that sort of thing happens and how it feels and h- how it helps or not, or/

Alfonso /Like um, if you like, like I like um, I like people to watch me a lot and stuff I like ... to make people laugh, so ...

Alfonso if you're that person, you would like to, but if you're somebody that's um like, shy and doesn't like to talk it's not good for you because even though I like, I like to go up on the board, if you miss a problem on the board and people laugh at you, it'll make you not wanna um, go up there any-anymore.

Alfonso So that's why when I go up there, I always bring my book just in case; I don't mess up.

I Okay. And do people laugh ... at people when they don't get it as they should?

Alfonso Mm-hm. They don't laugh at you in front of your teacher, but like, sometimes when you leave class they like, make fun of you.

Olivia (US1-L03, 110-145)

I Oh. Which part? Tell me.

Olivia It's when I went up to the board.

I Ah. Right. Yes. How does it feel when you go up to the board?

Olivia Nothing.

I Nothing?

Olivia Just, just feel like putting down the answer.  
 I Ah. Okay. What do you think when you go up to the board?  
 Olivia I just think of the problem. How I'm gonna answer it.

Autumn (US1-L06, 37-43)

I What were your personal goals for that lesson?  
 Autumn This lesson?  
 I Mm-hm.  
 Autumn To understand it and get through it.  
 I Okay, and what does understand mean for you? When do you know you understand?  
 Autumn When I can- I can like, go up to the board and do a problem and get it right.

## US2, lessons 1-10

Lesson	TimeIn	TimeOut	Description
1 (1)	05:26	07:54	The teacher calls 8 students to solve 4 different tasks from the warm up in parallel at the board; each pair is allowed to collaborate on one task. One student volunteers to solve the fifth task on the board.
1 (2)	10:35	10:46	The teacher calls a student to show his solution („Come show us...quick quick...“)
1 (3)	21:05	22:00	The teacher talks to the student at the board to save time.
1 (4)	22:00	22:48	The teacher asks a student to sketch a graph on the board.
1 (5)	29:35	30:00	One student sketches two graphs on the board.
1 (6)	31:51	33:10	Two students are filling in columns of a T-chart.
2 (1)	02:46	13:47	Eight delegate students pin posters from group work on the board and read them out. The posters from the remaining groups are hold up by the teacher on the desks and read out by a student. One student stays at the front and pins the remaining posters on the board.
2 (2)	34:20	35:02	One student draws a graph on the board
3 (1)	14:03	14:55	One student is asked to explain his result of a warm up task at the board. The teacher makes clear that his version is wrong.
4 (1)	08:25	13:16	Students pin posters from group work on the board after controlled by the teacher.
4 (2)	20:25	21:25	One student pins a poster on the board.
4 (3)	30:57		One student is asked to point out distinct graphs on the posters at the board.
4 (4)	32:18	33:19	One student points at a part of one task.
5	17:44	Not identifiable	One student makes notes at a flip chart.
6	17:37	18:12	One student is asked to explain the assignment again.
7 (1)	18:50	19:27	One student writes her solution at the OHP.
7 (2)	24:45	25:40	One student draws a graph on the board.
7 (3)	29:27	30:30	One student writes the solution of an equation on the OHP. She is called again to the board to adjust a graph that is already there.
8 (1)	27:16	29:30	Students bring back the containers with materials.
8 (2)	35:30	42:26	Four students from group 1 hold up white boards from group work. The students read out what is on their boards.
8 (3)	40:15	42:26	Four students from group 2 hold up their white boards from group work.
8 (4)	42:30	47:15	Four students from group 3 hold up their white boards from group work.

8 (5)	45:10	47:15	Four students from group 4 hold up their white boards from group work.
9 (1)	07:55	09:20	Two students talk with the teacher at the teacher desk about one graph on one of the white boards from the day before.
9 (2)	11:40	13:39	One student fills in a T-chart with the numbers dictated by other students.
9 (3)	27:17	30:22	Students carry their white boards to the front.
9 (4)	31:07	37:28	Three students hold up their white boards. The teacher explains that she had made a mistake so that the task was hard to solve.
9 (5)	40:23	45:22	Seven students from two groups hold up their white boards.
9 (6)	42:10	42:48	One student points to the y-intercept on a graph.

## Functions

### 1. Publicizing work, explaining work

The students write solutions of tasks they have completed in individual seatwork on the board. These are usually the tasks from the warm up. In the first event in lesson one the students are asked to do this in pairs so that they can compare and discuss their results. The teacher comments after the students have finished, sometimes by questions posed to the whole class. In contrast to the other classrooms, the teacher still queries the presenters after they had sat down. At times the teacher summarizes major points, for example, pointing out you divide to “break a multiplication bond” or that taking the square root undoes squaring. The students do in general not explain their solutions while out the front; this is of course impossible when more than one student is at the board. The following lesson transcript gives an impression of the type of whole class interaction that follows the sharing of results by writing these on the board:

### **US2L01 (00:05:21:28 to 00:13:28:26)**

The teacher selects pairs of students to collaborate in the presentation of results from individual seatwork on the “warm-up” problems.

00:05:21:28	T	Alright, let's see Um ...
00:05:26:21	T	Glenna and um, Letitia come up and show us number one, the two of you. You can collaborate on the answer there.
00:05:36:03	Ss	[Glenna and Letitia stand and walk up to the board].
00:05:37:03	T	Um, the second one um, how about you Sandra, and um, Ashley. The two of you decide, put your verdict up there. Mm, number three, um, Derek and um, mm ... Carl.
00:06:09:10	T	Okay, four Keegan, how about uh, with Malcolm.
00:06:27:24	T	Wait just a minute. Uh, just a moment. Excuse me, no.
00:06:41:11	Ss	[Glenna and Letitia confer over the problem on the board].
00:07:08:27	T	Okay, last one, who's willing to go? Who's willing to give it a try? Alright, Derek, you need a collaborator? Alright, you're on your own.
00:07:53:21	T	Okay. Who worked on this one? Okay, [chuckles] alright, ladies, ladies. Um, I equals P- P. I over pt equals r. Um, where did this come from? Why did you make that decision?
00:08:19:23	Glenna	Um, because when you multiply ( ).



00:08:24:28	T	Okay. If you need to break a multiplication bond folks, we do that by-
00:08:29:19	Ss	Dividing.
00:08:30:04	T	Dividing. And obviously we've already divided on this side. Because the pt mysteriously disappeared. O-key-do-key. Alright, let's take a look at this one.
00:08:41:07	T	Uh, moving from here to here, what property folks?
00:08:44:04	Ss	Distributing.
00:08:44:22	T	Distributing property. Okay, um then what, who- who worked on this one? Alright, Sandra, what happened next? Moving from here to here, second to third step.
00:08:59:02	Sandra	( ).
00:09:00:15	T	Alright, subtract two off from both sides because we have an added two L. And then finally-
00:09:05:10	Sandra	( ).
00:09:07:26	T	Divide by two. Um, did someone else- did anyone take this any farther, how many people left this one in this form? P minus two L over two. (Other people) have a different form?
00:09:28:17	T	Everybody convinced that this is okay? This is one writing, is there another writing that might work?
00:09:35:03	T	What do you have Kevin?
00:09:36:05	Keegan	P minus L equals W.
00:09:41:08	T	Oh, okay, here's- here's what I heard Keegan say. P minus L equals W, yes, that's what you told me?
00:09:55:11	Keegan	Yeah.
00:09:57:17	T	How many people agree with that, hands up if you agree with that.
00:10:02:06	T	How many people have a problem with this one, this writing? Some people are undecided. A lot of people are undecided. Are- are these equivalent?
00:10:13:16	T	What he's saying is that P minus two L over two which we decided was okay is equivalent to that, that true? Hmm, where did the L come from?
00:10:30:14	Keegan	( ) just divided two L.
00:10:35:06	T	Come show us, quick, quick, quick.
00:10:40:13	Keegan	[Comes up to the board and writes] ( ) divided ( ) two's.
00:10:41:09	T	Alright the t- the two's cancelled out. But ... little fault in thinking, what is it, Abbie?
00:10:49:11	Abbie	( ) divided both sides of the problem ( ) divided P by two also.
00:10:52:26	T	Ah, he has to- he has to divide both terms by two, right? So how could I fix it then? This P has to appear over a denominator of two, okay.
00:11:06:12	T	I- I can't tell you what I- I can't predict what form you might see, uh about one appearing in. But uh, you should be able to recognize this expression in- in other- in other guises.
00:11:25:06	T	This- this may be- this might be a possibility because of the possibility of these two's canceling out. Alright, um let's see D.
00:11:40:03	T	Anybody have any problem with this one, here it is keep it up behind here. Okay, how many people agree, stand up.
00:11:49:16	Ss	[Many students stand].
00:11:52:12	T	Alright, ( ), don't agree Veronica? Do you or not?
00:11:57:08	Veronica	Yeah, I do. //( ) I'm lazy.
00:11:58:07	T	//Yeah, you do. Okay, alright, just tired, okay.
00:12:00:01	Ss	[The Students sit].
00:12:03:02	T	Alrighty. Um, uh-oh, what happened to numero cuatro [number four]?
00:12:11:24	S	( ).
00:12:12:04	T	Oh, there it is, okay. Alright. Um, do you see it? Here we go. A equals S squared, uh, okay folks ... what operation do we have here?
00:12:32:01	Ss	Square, squaring.
00:12:33:04	T	Squa- squaring. How do we undo squaring?
00:12:35:13	Ss	Square root.
00:12:36:03	T	Square root, okay. Okay? Square root of s squared is s, good. Alright, last one, um ... here it is, y equals mx plus b? Who worked on this one? Daniel? Okay, Daniel tell us about it.
00:12:57:10	Derek	Um, first you have to get rid of the addition, so you subtract it so-

00:13:01:03	T	[Writes on board] Alright.
00:13:02:16	Derek	And then it moves over with the y, so it's y minus b equals mx. To get rid of the m, you have to divide ( ) of multiplying ( ) divide.
00:13:12:01	T	Okay. And this one is actually shown um, rather specifically. Uh, here the thinking is more implied. Here the thinking is more obvious. It's laid out there step by step.
00:13:28:26	T	Um, either, at this point in time, either choice you make uh- is fine with me. This is a nice representation too. Okay, good work. Um, we're ready to move on.

## 2. Displaying work

In many of the events the students are asked to show the results of their group work to the class, either on white boards or on posters. In these instances the students do not explain but only read out what is written on their boards. The teacher evaluates their product by illuminating, comparing or expanding on it. Lauren's description reflects this:

Lindsey (US2-L06, 462-464)

I ( ) Um ... was this typical lesson for you?

Lindsey Um ... usually. Cuz I think, like, we are getting to- we- we learn about something, we get into groups and we do something, *display it in front of the class*.

## 3. Division of labour between teacher and students

Sometimes the students are out the front only for a very short time in order to answer a single question related to a task discussed with the whole tasks. These are often "Learning Tasks" (cf. Mok, this symposium). In general, the teacher tries to delegate parts of her work to the students as far as possible. Even when the students are only bringing back and picking up materials, this might be interpreted as an indicator of this intention. The events are listed in the table above, even though these are not examples of Student Out the Front according to the definition. In G3, for example, the teacher always collects and distributes materials herself. However, the third function in G3 also is an example of this principle.

In the interviews, some students give general comments on the function of going to the front. Sharing and comparing work is also one of their perception of the purpose. Presenting work seems to be enjoyed by the students. In the lessons, the class often applauds when other students have displayed their work.

Shannon (US2-L02, 297-311)

I So you know, when you see people, when they start going up and they- reading their answers and putting them up on the board, what- what happens for you? Like, what do you do when that's going on? Or, what did you do today?

Shannon Well ... like what do I think?

I Yeah.

Shannon I sort of wish that I was up there. Cuz I like- I like presenting stuff //in front of the class.

I //Oh, you do?

I So you'd rather go up and do- do it?

Shannon Yeah. Well, if I kn- understand it. Like, um, last- well the first time that our class was being video taped/

I /Yeah.

Shannon And it was our group too. Um, I raised my hand like six times. But she kept calling on somebody else. And, um, cuz I knew the answers and I felt proud of that because I don't usually know much answers in that course one.

I Oh!

Naomi (US2-L03, 406-415)

I Does she have students come up to the board a lot?

Naomi Yeah.

I Do you like to go up to the board?

Naomi I haven't really been up to the board a lot. But, she does bring kids up to the board to do the warm ups.

I Mm.

Naomi To explain the warm ups.

I Is it helpful to have other kids explain it?

Naomi Yeah. Cuz if I got that one wrong, I could see how they got it right.

I Mm-hm.

Abbie (US2-L04, 198-209)

I What helped you learn, just, like actually what helped you learn in class? Stuff that ( ) were going to cover.

Abbie In class I think something that really helped me learn was when um, we do things on the board where we show our different work, and how different people found it.

Abbie Because if I don't understand how the teacher does it, somebody else does it on the board-

I Mm-hm.

Abbie Then I can look at their thinking, compare it to the teacher's and see how they're similar, but how they're different. And I can make my own way of figuring it out based on theirs.

Abbie If you only have one way, then you don't know any other way to do it, and you can't figure out your own. Cuz it's too solid, there's nothing to compare, contrast.

### Discussion

There are similarities in function across the classrooms under study. However, each classroom seems to have a distinct repertoire of forms and function. In this respect the two classrooms from Hong Kong appear to be more similar to each other than all the other classrooms.

The meaning the students attribute to being out the front differs by the function of this activity. It seems that the students in G3 do not appreciate solving new tasks in public. This function is not so common in the other classrooms, though in US2 and in HK1 students are also involved in solving parts of “Learning Tasks” in public. A general observation refers to the amount of students’ talk while presenting and sharing work at the front. Students do not get many chances to learn how to present and explain their work without interference of the teacher. The longest period, in which students struggle to explain to the whole class occurs in G1 (lesson 7).

What a student or the teacher does while out the front is intended to become public. However, in some of the classrooms under study private talk occurs when students are at the board. In Hong the function of publicizing and sharing is not obvious.

There is a variety of ways by which the teacher tries to call students to the front. The teacher might ask some students while walking between the desks, call students by their names, point at students or ask for volunteers. The extent to which the students feel obliged to follow the invitation to come to the front varies. In G3 and US1 students seem to have more freedom of

choice. It seems that these teachers who teach classrooms with low achieving students try to avoid calling upon them if they do not like it. While the turn-taking mechanism in some classrooms includes students talking public without getting a turn, it never happens that a student coming to the board is a self-initiated act that has not been sanctioned by the teacher except in G3, lesson 7. Coming to the front is a more or less popular activity, depending on the function of this form of interaction and on the students' confidence.