**Two Classroom Scenarios**

**METHODOLOGY**

The participants in this study were selected through purposive sampling. I was looking to compare two very different teaching styles and thus asked a number of school administrators to recommend to me high school mathematics teachers they believed to be effective mathematics teachers and they believed to be confident in their practice. Through this process a pool of 15 teachers were recommended to me. Of these 15 teachers, six agreed to have one of their 'typical' mathematics lessons filmed. Each of these videos was produced using a camera which followed the teacher during the lesson.

For the research presented here I have selected for analysis two of these videos – one of a teacher named Claireand one of a teacher named Connor. Claire has been teaching high school mathematics for 15 years. She teaches primarily the senior (grades 11 and 12) academic courses. Connor, on the other hand, has been teaching for only 8 years, teaches all levels of high school mathematics – both academic and non-academic – and also teaches some junior (grades 8 -10) science.

**RESULTS**

In what follows I give a brief synopsis of Claire's and Connor's lesson marked with a time stamp as to when key moments of each lesson occurs. For brevity purposes these synopses focus only on the actions of each of the teachers.

**Claire's Lesson (grade 11)**

00:00 Claire begins with a brief review of the previous lesson.

06:30 Claire delivers a 'lesson' on calculating the angle θ (0o < θ ≤ 360o) given a trigonometric ratio r. This lesson involves her giving several examples of how to solve such tasks.

22:00 Claire asks the class to solve for θ: sin θ = 0.8, cos θ = 0.32, and tan θ = 1.2. During this activity Claire circulates and checks on how students are doing. When a student puts up their hand she quickly moves to them and answers their question. The first two questions asked by students pertained to the fact that the ratio for the third question (tan θ = 1.2) is greater than 1.

26:15 Claire stops the activity to re-explain the limitations on the ratios for each trigonometric relationship.

31:00 Claire calls the class to attention and goes over the solutions to each of the three questions.

36:30 Claire gives the next question for the students to solve (solve for θ: 3sin θ + 1 = 2.8; 0o < θ ≤ 360o). Almost immediately many students put up their hands. Claire helps two students to understand the task and begin to solve it.

40:00 Claire calls the class to attention and reviews how to solve the equation 3*x* + 1 =2.8.

42:30 Claire refocuses the students on the original task: 3sin θ + 1 = 2.8.

50:00 Claire calls the class to attention and goes over the solutions to the question.

55:30 Claire assigns homework.

**Connor's Lesson (grade 11)**

00:00 Connor reviews how to multiply two first degree binomials on the board: (*x* + 2)(*x* + 3) = *x*2 + 5*x* + 6. He then asks the question, "what do the binomials have to be if the answer is *x*2 + 7*x* + 6?"

01:30 Connor places the students into random groups and asks them to work on vertical whiteboards to find the answer. He then begins to circulate amongst the groups as they begin to work on the task.

05:00 Connor stops to speak with a group who is having trouble understanding the task. He re-writes the example as follows:

(*x* + 2)(*x* + 3) = *x*2 + 5*x* + 6

(?)(?) = *x*2 + 7*x* + 6

He then points to the question marks and asks, "what has to go in here so that the product of the two binomials is this (pointing at the quadratic expression)? I'll give you a hint – look at the last number."

06:00 Connor repeats the above process with another group.

07:00 Connor asks a group who has an answer to check their solution by multiplying the binomials. Once the solution is confirmed he gives the group a new task: *x*2 + 6*x* + 8.

07:30 Connor helps another group in the same fashion as above.

08:30 Connor gives a new task to two groups asking them first to check their answer.

09:00 For the next 32 minutes Connor moves around the room giving new tasks to groups that have finished and checked their solution, and helping groups that are stuck. Sometimes he works with two or three groups at the same time. Eventually Connor projects a list of 20 progressively challenging tasks onto a wall. These range from the initial task of *x*2 + 7*x* + 6 to tasks as complex as 6*x*2 + 10*x* - 4. The groups start to move through these tasks one by one solving each and checking their answers.

41:00 Connor gathers the students around one whiteboard and asks them to walk him through how to solve the question *x*2 + 5*x* – 24. Connor forces the students to articulate their thinking at each step.

47:00 Connor suggests that the students sit down and write down some notes for themselves on how to solve tasks of the type seen during class.

52:00 Connor projects five more tasks on the wall and asks the students to solve them on their own.

 Liljedahl, P. (2016). Flow: A framework for discussing teaching. Paper Presented at PME