

Tabletop Teaching Simulation: Collaborative Multivoiced Simulation for Improving Lesson Plans in Pre-service Training

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Abstract: This paper describes a tabletop teaching simulation system to help pre-service teachers create and revise their lesson plans from the perspective of learners in a school classroom. Pre-service teachers collaboratively simulate possible lectures on the tabletop, imagining various voices of learners and using puppets attached with AR markers. The simulations can be recorded, enabling pre-service teachers to consider in depth improvements to the lesson plan, as well as being used for careful review after the simulation.

Introduction

Learning how to create lesson plans is an important part of teacher education before pre-service training internship. While planning lessons, teachers should consider not only the instructions given to the learners, but also the possibility of refutations from them. Teachers are also required to design effective questions and predict their possible answers, and encourage students to engage in inquiry-based learning.

This process can be explained using Bakhtin's theory of dialogism - every utterance made by a speaker can be considered a direct/indirect answer to a possible question by the audience. For example, a speaker anticipates possible refutations from the audience by calculating the listeners' backgrounds, previous utterances, and attitudes towards the on-going speech. The speaker then organizes his/her speech to avoid the refutations (Wertsch, 1991). In this way, the speaker's utterance is a response to previous utterances; therefore, the utterance is embedded in a dialogic relationship. For Bakhtin, the speaker's partner in the dialogue is an imaginary audience whose cultural and collective sensibilities - such as common sense, age groups, and nationalities - are taken into account (Bakhtin, 1986). Wertsch calls this characteristic "multivoicedness" (Wertsch, 1991). Meanwhile for the audience, understanding a multivoiced utterance is also a multivoiced process. According to Bakhtin, understanding an utterance involves an attempt to find "counter words" (such as questions, understanding, or criticism) in order to respond to the speaker's utterance. Through this conversation - conducted using "counter words" and the speaker's voices - the meaning of the speaker's utterance is negotiated and then determined (Bakhtin, 1986). Generally, only the teacher talks to the learners in a lecture-style teaching - rather than engaging them in a conversation. However, Bakhtin considers such a one-way speech to also be a conversation with the audience. According to this viewpoint, even in a one-sided lecture, the teacher's utterances are considered responses to possible reactions by learners; if the answers satisfy the needs and questions of the learners, then the content of the lesson is better understood. Therefore, when creating lesson plans, focus should be placed on stimulating interactions between learners and teachers by predicting the learners' reactions to the instructions; accordingly, the creation of a lesson plan must involve multivoiced planning.

Hence, developing an appropriate lesson plan based on assumed perspectives of the learners is especially difficult for novice and pre-service teachers. This is especially with undergraduate students, who have had few opportunities to participate in actual classroom lessons; it is difficult for them to create interactive lesson plans that are composed of appropriate questions and answers between the learners and teachers.

Microteaching is widely recognized as a useful method for understanding the multivoiced perspective of learners. However, reactions and feedbacks provided by colleagues acting as learners are sometimes out of context - as pre-service teachers must play the role of a much younger pupil. Furthermore, their reactions and feedbacks cannot be ensured to be serious, honest, or realistic due to embarrassment or hesitation. Thus, microteaching cannot directly improve a pre-service teacher's ability to imagine possible learner reactions.

Cartoon-based teaching simulation (Mochizuki, et al. 2010) is another means to help pre-service teachers imagine concrete conversations among the learners and teachers in an actual classroom scenario based on their lesson plans. This simulation asks pre-service teachers to present their lesson plans in the form of a cartoon. An actual implementation in a pre-service training showed that pre-service teachers could externalize their planned lesson in a more concrete way using cartoon characters playing the roles of various learners, and could reflect on their lesson plans from the perspective of the learners. However, some pre-service teachers could not generate appropriate dialogues among the learners and themselves because the dialogue was *internally* conceptualized by the pre-service teachers, based on experiences from their own schooldays.

Multivoiced Collaborative Teaching Simulation using Tabletop Technology

We propose the tabletop teaching simulation system where, through a puppet show in a miniature classroom, the pre-service teachers will be able to act as learners and teachers much more seriously, honestly, and realistically; hence represent imagined voices and the relations among the learners with greater accuracy.

Originally, Sakamoto (1980) developed the “Desktop teaching simulation game” that took place in a miniature classroom on a paperboard with puppets - consisting of a teacher, ten to twenty learners, and several paper devices such as desks, chairs, and other necessary tools in the classroom. The teacher's and learners' behaviors were acted out verbally and non-verbally by the players. Players taking the learners' roles acted simultaneously, and operated a few puppets each. Sometimes they were expected to let the learner puppets behave problematically. If someone felt the teacher's instructions had problems, the game may be interrupted to discuss improvements of the teacher's and pupil's actions as well as the overall lesson plan.

On the other hand, our new tabletop teaching simulation has been developed using tangible technology. As shown in Figure 1, the tabletop classroom is designed on a transparent desktop. An AR (Augmented Reality) marker is attached to the bottom of each puppet and device to identify the actors and furniture in the classroom. A webcam is installed under each tabletop classroom to capture and record each marker's movements and players' voices. The players can replay the recorded simulation on a Flash player, and discuss how to improve the teacher's and learners' activities in the lesson procedure.



Figure 1. Pre-service Teachers' Activities and Reflection Using the Tabletop Teaching Simulation.

There are three significant advances in the tabletop teaching simulation from previous methods. First, as a result of the participants substituting puppets to play the roles of potential learners (Klopfer, 2008), this simulation can reduce the participants' embarrassment or hesitation as seen in microteaching and create realistic responses in the classroom. Second, this simulation can deepen a pre-service teacher's insight by having them consider the voices of various learners, and by sharing those perspectives. Creating multivoiced lesson plans requires an in-depth prediction of various learners' voices based on personal values and backgrounds of the pre-service teachers; in other words, it is difficult for novice and pre-service teachers to predict a variety of learner's voices due to lack of sufficient experiences or deep insights in actual classrooms. However, in this kind of collaborative simulation, pre-service teachers can be made aware of various learners' perspectives by sharing pupils' voices from the pre-service teachers' colleagues. Third, the simulations can be recorded - enabling pre-service teachers to consider in depth improvements to the lesson plan, as well as being used for careful review after the simulation. To improve lesson plans effectively, it is important for pre-service teachers to clearly externalize their lesson plans in the form of a puppet play that depict conversations among the teacher and learners, and critique with each other. Furthermore, careful examinations of the recorded simulations act as an important catalyst for the pre-service teachers to consider deeply about designing the overall conversation in the classroom to achieve the educational goal. Records of the puppet play allow pre-service teachers to ask their colleagues for feedback regarding both their lesson plans and actions in the simulation. The feedback can give the pre-service teachers further insight about possible learner reactions.

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