Using “Teacher Moments” as an Online Practice Space for Parent-Teacher Conference Simulation in Preservice Teacher Education

by

Kesiena Owo-Ovuakporie

BEng (Hons) Electrical and Electronic Engineering, The University of Manchester, 2010

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Signature redacted

Institute for Data, Systems, and Society
Department of Electrical Engineering and Computer Science
May 25, 2017

Signature redacted

Justin Reich
Research Scientist, Dept. of Urban Studies and Planning
Thesis Supervisor

Signature redacted

Ruth Rosenholtz
Principal Research Scientist, Dept. of Brain and Cognitive Sciences, CSAIL
Thesis Reader

Signature redacted

Professor Munther A. Dahleh
Director, Institute for Data, Systems, and Society

Signature redacted

Professor Leslie A. Kolodziejski
Chair, EECS Committee on Graduate Students
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Submitted to the Institute for Data, Systems, and Society and the Department of Electrical Engineering and Computer Science on May 25, 2017, in partial fulfillment of the requirements for the degrees of Master of Science in Technology and Policy and Master of Science in Electrical Engineering and Computer Science

Abstract

The aim of this thesis is to investigate and improve the suitability of Teacher Moments as an online practice space for parent-teacher conference simulation in preservice teacher education. We evaluate Teacher Moments by means of a playtest conducted with students of a preservice education class for undergraduates in the Scheller Teacher Education Program (STEP) at MIT. We set out to answer 3 research questions. 1) How do users perceive the authenticity of parent-teacher conference simulations in Teacher Moments? 2) How do students’ reflections relate to the learning objectives after completing a parent-teacher conference simulation in Teacher Moments? 3) How do new users perceive the ease of use of Teacher Moments interface? Most of the preservice teachers in our study felt the simulation experience was authentic and the user interface was easy to use. The main themes we identified in the students' reflections and class debrief were aligned with the simulation learning objectives.

Thesis Supervisor: Justin Reich
Title: Research Scientist, Dept. of Urban Studies and Planning

Thesis Reader: Ruth Rosenholtz
Title: Principal Research Scientist, Dept. of Brain and Cognitive Sciences, CSAIL
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CHAPTER 1

INTRODUCTION

This thesis draws upon an ongoing design based research project to investigate and improve the suitability of Teacher Moments as an online practice space for enhancing the skills of preservice teachers.

Teacher Moments is an interactive web application developed at MIT Teaching Systems Lab (TSL) to facilitate online simulations for teacher education and professional development. Teacher Moments is an open source, publicly accessible platform that enables users to experience various simulations without having to purchase special equipment or commit significant resources in advance. Current scenarios in Teacher Moments focus on unconscious bias in computer science education, classroom management, motivating students, inquiry practices in a science classroom, and parent-teacher conferences. Some of the scenarios in Teacher Moments were developed by TSL while some others were adopted from scenarios created and used by teacher educators for clinical simulations.

This thesis focuses on the work done to investigate and improve the user experience of Teacher Moments as an online space for preservice teachers to practice navigating difficult problems of teaching practice. This thesis builds on work done by Benjamin H. Dotger as described in his book “I Had No Idea”: Clinical Simulations for Teacher
Development [20]. We adapted two of Dotger's parent-teacher conference simulations for testing Teacher Moments as described in chapter 5 and appendix A. Although this thesis focuses mostly on the work done with parent-teacher conference scenarios, the user interface design of Teacher Moments was also influenced by an earlier playtest involving classroom management scenarios as described in appendix A.

This thesis is structured as follows. We begin with a description of the background context and research motivation for this thesis in chapter 2. Chapter 3 provides a description of other related works. In chapter 4, we provide a description of the current design and software implementation of the features that facilitate parent-teacher conference simulations in Teacher Moments. In chapter 5, we describe our research questions, participants and classroom context, playtest protocol, learning objectives, and logistics. We present our results in chapter 6, while chapter 7 provides a follow up discussion of our research findings. Chapter 8 talks about the current limitations of Teacher Moments and future work. In chapter 9, we conclude with a summary of this thesis.
CHAPTER 2

BACKGROUND AND MOTIVATION

2.1 Preservice Teacher Education

In recent years, there have been increasing demands for a shift in the curriculum and pedagogies of teacher education from a predominant focus on specifying the required knowledge for teaching towards a focus on core practices and a practice-based curriculum [55][15][37][41]. There is a growing consensus that a lot of what teachers need to learn must be learned in practice and from practice because such knowledge cannot be learned entirely in advance while preparing to become a teacher [6][29]. After conducting a comparative study of professional education across teaching, clinical psychology, and the clergy, Grossman, Compton, Igra & Williamson (2009) concluded that prospective teachers have fewer opportunities to engage in interactive practice compared to novices in the other professions they studied [28].

Teacher candidates in a college- or university-based preservice teacher education program primarily learn from campus graduate education courses and field placements (also referred to as practicum). Field placements have traditionally provided the opportunity for prospective teachers to observe other experienced teachers, practice what they have learnt in their campus courses, engage with other paraprofessionals...
in real settings, and gain valuable experience that could serve as a practical point of reference for future reflections and further learning. In spite of the benefits of field placements, various factors surrounding their implementation often undermine the quality and learning outcomes of field placements for preservice teachers. Such factors include shortage of host teachers, lack of diverse experiences, limited opportunities for repeated practice, and poor integration between field placements and university curriculum [33][35][54]. As a result, a cohort of preservice teachers who went through the same collegiate instructions may end up with vastly different experiences which vary in quality and learning outcomes [20]. Furthermore, education faculty may find it difficult to facilitate appropriate reflection and debriefs related to field placements due to the lack of shared experience amongst students [30].

We believe that Teacher Moments could be used to augment field placements and facilitate practice-based pedagogy in teacher education programs. This is because Teacher Moments provides opportunities for preservice teachers to engage with scenarios and challenges of teaching practice in a safe, authentic, simulation environment which they can experience individually and analyze collectively with peers and educators.

2.2 Parent-teacher Conferences

Parent-teacher conferences are often perceived as sources of frustration, anger, strong emotions, and awkward conversations [36]. Despite the importance of parent-teacher conferences, most teachers lack adequate preparation and formal training for working with families [36] [24]. Due to the brevity and structure of field placements, preservice teachers do not experience the full range of parental concerns and student challenges that are common to K-12 settings [20, p. 9]. Even when schools administrators provide rigorous support and supervision for new teachers, the administrators tend to focus almost exclusively on pedagogy and not on helping teachers establish and navigate relationships with families. As a result, new teachers tend to develop their own approaches to managing parent relationships through trial and error, learning
from their failures, or relying on intuition [36].

We believe that Teacher Moments could help prepare new teachers for parent-teacher conferences by providing them with opportunities to practice these conferences in a low-cost, easily accessible simulation environment.

2.3 Simulations as a Pedagogical Tool in Teacher Education

A simulation is “a simplified, dynamic and accurate model of reality” implemented as a system and used in a learning context [38]. Although simulations often involve digital technologies, the use of digital technologies is not necessary for implementing a simulation [33].

In recent years, teacher educators have been exploring simulations as a means of facilitating practice-based pedagogy, augmenting field placements, and enhancing various aspects of teacher education [33][22][43]. Simulations can be used to provide learning experiences in a safe environment that enables teachers to rehearse for important and sometimes difficult situations that they may experience as teachers. Examples of such situations include knowing what to say to a disruptive student in class, striking the right balance between asking questions or keeping silent, or having a meeting with an arrogant parent who is upset about her child’s academic performance. Simulations provide opportunities for practice in a safe space because no real students, parents, or relationships are harmed during simulations.

Although the use of simulations in education is relatively uncommon, simulations are well-established as tools for facilitating teaching, learning and assessment in other fields such as medicine, aviation and the military [33][25][8][44]. Some of the reasons for slow adoption of simulations in teacher education include the financial cost of acquiring the required technology and personnel, the time required to develop or source simulations, time required to learn how to use the simulation technology, logistic challenges involved in coordinating clinical simulations with medical colleagues in
clinical skills centers, and educators' reluctance to changing their teaching approach 

20[20][33][30].

We believe that a simulation platform like Teacher Moments could serve as a 
low-cost platform for disseminating clinical simulations as a pedagogical approach 
for teacher education. Teacher educators can try out various simulations on Teacher 
Moments and incorporate these simulations as instructional tools in their classes 
without having to purchase any special equipment or commit significant resources 
upfront. The only equipment required is an internet enabled device with a web 
browser. These are features that are available on most laptops and smartphones. As 
a result, a platform like Teacher Moments could help lower the cost of experimentation 
when developing new simulations and also lower the barrier for adoption of simulations 
as a pedagogical approach in teacher education programs.
CHAPTER 3

RELATED WORK

The current implementation of parent-teacher conference simulations in Teacher Moments requires participants to provide audio responses to pre-recorded video scenarios. This design was influenced by some of our earlier playtests and work done by other educators and researchers on clinical simulations and using video recordings in teacher education. This chapter provides a description of related works that influenced our design.

3.1 Video Recordings in Teacher Education

One of the common applications of video recordings in teacher education is video-based cases. This typically involves watching a video recording of a teaching scenario and then having a discussion about the issues that emerge [31]. Video recordings are commonly used for case-based learning in teacher education and professional development [26]. Such videos can be obtained from universities and other educational institutions via internet download or physical storage devices [54][26]. For example, InsideTeaching is a web archive of multimedia recordings of K-12 teaching practice hosted by Stanford university's Center to Support Excellence in Teaching (CSET)
and used by teacher educators across the US in their campus-based courses [54][52]. Video-based cases provide opportunities for preservice teachers to observe a variety of teaching strategies and assessment techniques in diverse settings that they may not encounter during their field experiences [39]. One key benefit of using videos in case-based learning is that videos can convey more of the complexities of a classroom than written cases [45]. Video cases tend to be used alongside other activities that engage preservice teachers in personal reflection and group discussions [13].

In spite of the benefits of video cases, one main disadvantage is that they may not get students to challenge and reflect on their own pedagogical skills. Even when videos are used together with other activities, such reflection could be difficult for students because students may not be aware of their own practices, associated beliefs, or inconsistencies between their beliefs and actual practice [1][49].

Micro-teaching is a common application of video recording in teacher education in a manner that partly overcomes the disadvantage of video cases. Micro-teaching requires teachers to prepare and teach a short, recorded lesson focusing on specific teaching skills to a small group of students [3]. The video recordings are then reviewed by the group and feedback is provided by the students, colleagues, and the instructor. Since the invention of micro-teaching by Dwight W. Allen in the mid-1960s, it has become established as a training procedure in many education programs [11]. Micro-teaching is widely considered to be an effective pedagogical approach in practice-based teacher education [32][9][4]. Research has shown that the feedback stage is one of the most essential stages in micro-teaching [2]. In addition, the use of video recording in micro-teaching is an important component that enhances the learning experience [34]. Although micro-teaching is an active and engaging experience for the teacher that delivers the lesson, it is still essentially a passive experience for the peers that need to sit through the lesson. Those that sit through the lecture do not get a greater sense of awareness about their own pedagogical skills. Besides, micro-teaching is a time-consuming process if used in a classroom. Only one teacher in each group can teach at a time. As a result, it takes longer for all micro-teachers to experience teaching in such environment.
Research has shown that interactive multimedia technologies can be used to effectively facilitate practice-based pedagogies in teacher education without the earlier mentioned disadvantages of video cases and micro-teaching [46][10]. An interactive multimedia system is “any computer-delivered electronic system that allows the user to control, combine, and manipulate different types of media, such as text, sound, video, computer graphics, and animation”[5]. For example, Hewitt et al. (2003) showed that educators could help preservice teachers develop deeper insights into their own classroom practices by getting the preservice teachers to quickly write down their immediate response to recorded teaching scenarios and then analyze their responses in small groups [31]. In spite of the benefits of interactive multimedia, there are several factors that could impede the adoption of interactive multimedia or other education technologies in teacher education programs. In the early 1990s, Hannah and Abate conducted a study to investigate why teacher educators were slow to adopt an interactive videodisc technology in their classes [30]. Their findings indicate that some of the main factors that hindered adoption of this technology were:

1. **Learning time and inadequate training**: The time it took instructors and students (i.e., preservice teachers) to learn how to use the technology was one of the most common reasons for not using it. Faculty who had used the videodiscs felt neither them nor their students could use the technology effectively without additional support from the project implementation team. Instructors felt they did not have sufficient training to use the technology. They also felt they could not ask students to use the technology outside of class because students did not have the skills to operate the equipment properly.

2. **Lesson planning time**: Some instructors did not use it because they felt they did not have the time to plan for exactly how the technology may fit into their course.

3. **Inadequate facilities and administrative support**: Instructors felt they did not have adequate facilities for their students to effectively use the technology. They attributed this to lack of administrative interest and support.
This thesis focuses on the first factor which relates to how easy it is for new or occasional users to achieve important tasks with Teacher Moments. We ignore the second factor because coming up with recommendations for how educators should plan their lesson time is outside the scope of this thesis. We ignore the third factor because Teacher Moments is a publicly accessible web application that anyone can use for free, even on their mobile phones. Due to the prevalence of mobile computing devices, it is unlikely that inadequate facilities would hinder the adoption of Teacher Moments in teacher education programs. With these in mind, we hope to design Teacher Moments as an interactive multimedia simulation platform that educators and preservice teachers can easily use without requiring extensive training or administrative support.

3.2 Clinical Simulations: From Medical to Teacher Education

Since the first medical simulation implemented by Howard Barrows at the University of Southern California in 1963 [7], clinical simulations have become a common practice for teaching and evaluating the clinical skills of medical students [8][40]. A core part of Barrow’s work was the use of standardized patients in his simulations. A standardized patient could be either someone trained to simulate a medical condition in a standardized way (i.e., a simulated patient) or an actual patient trained to present their illness in a standardized way [8]. Although his students were aware in advance that it was a simulation with a standardized patient, they were instructed to approach and interact with the standardized patient exactly as they would interact with an actual patient. Barrow then evaluates their performance on the basis that they would behave exactly the same way with an actual patient [8][7].

Studies have shown that the educational use of standardized patients and clinical simulations are an effective technique for teaching and assessing clinical skills in medical students [51][50][40]. In the United States, standardized patients are currently
used to assess the clinical skills of both foreign medical graduates and American medical students as part of Step 2 of the United States Medical Licensing Examination [53].

In 2007, Professor Benjamin Dotger began adapting clinical simulations for training future teachers and school leaders to be better prepared to handle common problems of practice [18]. Similar to the role of standardized patients in medical simulations, Dotger and colleagues recruit and train professional actors to play the role of a standardized individual (i.e., parent, student, or paraprofessional) in the simulations [20][18]. By standardized individual, we mean that multiple actors are trained to embody a specific individual (e.g., a parent, student, paraprofessional, etc) in a consistent manner for all participants of a simulation [21]. Dotger uses simulations in conjunction with pre- and post-simulation debriefs to promote teacher reflection on the problem of practice encountered in the simulation [20].

Dotger's first set of simulations focused on the use of standardized parents in a parent caregiver conferencing model. Specifically, the simulation required participants, typically preservice or licensed teachers, to interact with the standardized parents who “present a variety of racial, ethnic, socioeconomic, and scholastic-related variables during the simulated parent-teacher conferences” [22]. Over time, Dotger’s simulations quickly expanded from the original focus on parent-teacher interactions to a broader focus on teachers and school leaders interactions in common problems of practice such as a teacher-initiated conference with a student about inappropriate behavior in class or a meeting with a paraprofessional colleague to discuss your classroom policies with regards to students with special needs [22].

Dotger’s simulations were done at the Standardized Patient Clinical Skills Center of SUNY Upstate Medical University (UMU) i.e., the center where UMU’s medical and physical therapy students interact with standardized patients as part of their training [22]. All simulations were recorded with the same technologies used at the facility for standardized patient simulations i.e., two cameras and microphones that are embedded in the ceiling of the exam rooms [22]. After each standardized parent-teacher conference in these rooms, the teacher is given access to their recording for
further reflection.

The benefits of clinical simulations to teacher education have been documented in various studies [18][19]. For example, clinical simulations have been shown to help stimulate preservice teachers' self-assessment of their instructional style and provide teacher educators with valuable data about the content knowledge, instructional abilities and practices of their preservice teachers [18]. One benefit of clinical simulations over field placements is that the simulations are standardized and provide the same shared experience that all student teachers experience individually and analyze collectively. Another benefit of clinical simulations over field placements is that clinical simulations provide teacher educators with ability to direct the learning outcomes by designing the simulation to focus on specific problems of teaching practice [20].

Since 2007, Dotger and colleagues have developed over 40 different simulations to support the teacher and school leader preparation programs at Syracuse University School of Education [17]. In addition, their work on clinical simulations have been adapted to various other types of training. For example, Elizabeth Self and colleagues at Vanderbilt University adapted Benjamin Dotger's work to create simulations to prepare preservice teachers for culturally responsive teaching [47][48]. Similar to Dotger's simulations, Self uses trained actors as standardized individuals. Her simulations are also recorded so that the participants (i.e., preservice teachers), faculty, and peers can watch them and use them as the basis of a group debrief with the instructor [47].

In spite of the researched benefits of clinical simulations to medical and teacher education, three main factors that impede the dissemination of clinical simulations as a pedagogical tool for teacher education are the required time commitment, associated costs and educators' reluctance to changing their teaching approach [33].

To get a sense of the financial costs of running a clinical simulation, Dotger budgets 1-2 hours of training and 3 hours for the actual simulation at a rate of $20 per hour. He also pays SUNY Upstate's Clinical Skills Center to use their facilities, so he does not need to purchase his own recording equipment. In total, it costs him about $200 per teacher for four simulation experiences. The required expenses and logistic challenges would most likely be greater for teacher education programs that are not
located close to medical schools with appropriate facilities. If an educator wishes to develop their own simulation, the cost of developing simulations that accurately represent authentic teaching practices require extensive time and funding beyond the cost of actually implementing the simulations [20, p. 54-55].

We believe that Teacher Moments could serve as a low-cost platform for disseminating clinical simulations as a pedagogical approach for teacher education. Teacher educators can try out various simulations on Teacher Moments without having to purchase any special equipment or commit significant resources upfront. The only equipment required is an internet enabled device with a web browser.
CHAPTER 4

TEACHER MOMENTS DESIGN AND IMPLEMENTATION

Teacher Moments is an interactive web application that provides novice teachers with the opportunity to practice their response to scenarios that approximate various aspects of teaching practice. Current scenarios in Teacher Moments focus on unconscious bias scenarios in computer science education, classroom management, motivating students, inquiry practices in a science classroom, and parent-teacher conferences. Teacher Moments is publicly accessible at https://threeflows.herokuapp.com/. It has a demo page (https://threeflows.herokuapp.com/demos) which contains links to various scenarios and simulations. The code is open source and publicly accessible on github (https://github.com/mit-teaching-systems-lab/threeflows).

One of our main goals is for Teacher Moments to serve as an interactive multimedia platform that enables preservice teachers to practice difficult parent-teacher conferences by engaging in authentic online simulations that do not involve live actors. Although Teacher Moments contains scenarios and functionality for practicing a variety of skills, this thesis focuses mainly on the parent-teacher conference simulations in Teacher Moments. In this chapter, we will describe the user interface and software
implementation details of the core features that facilitate parent-teacher conference simulation in Teacher Moments.

4.1 User Interface for Parent-Teacher Conference Simulation

During the parent-teacher conference simulation, the participants navigate through four main pages: the welcome page, video scenarios, audio response page after each video scenario, and finally a summary page that shows all the video scenarios and audio responses created by the user during the simulation. Teacher Moments currently runs on standard web browsers. Here are some further details and screenshots of each of the four main pages that participants navigate through during the simulation.

4.1.1 Welcome page

![Teacher Moments welcome page](image)

This is where participants enter their email address or playtest ID. It also provides some basic tips and instructions about the simulation.
4.1.2 Video scenario

![Image of Teacher Moments video scenario](image)

Each parent-teacher conference simulation consists of multiple scenarios. Each scenario begins with a video of the parent talking to the teacher (i.e., the user)\(^1\).

4.1.3 Audio response

At the end of the parent’s speech, the application instantly advances to the next page which prompts the teacher for an audio response. This page shows a still image of the parent and begins capturing the user’s audio response immediately the page is displayed. Once the user finishes recording their response and clicks “DONE”, the application advances to the next scenario if there are more scenarios in the simulation. Otherwise, it advances to the summary page.
Figure 4-3: A still image is displayed while recording an audio response

Figure 4-4: Summary page displaying all the video scenarios and audio responses at the end of the simulation

4.1.4 Summary page

This page presents a list of all the video scenarios and the user's audio responses. This enables the user to review the scenarios and their responses during the post-simulation reflection and the debrief. This page also enables users to download their

\footnote{Note that the first parent-teacher conference simulation implemented in Teacher Moments (i.e., Lori Danson simulation described in Appendix A) presents text scenarios as opposed to videos.}
audio responses using the standard browser feature by right-clicking on the audio control.

4.2 Software Implementation

Teacher Moments is a web application built with React.js (frontend), Node.js server and PostgreSQL database. The codebase is publicly accessible and hosted on github (https://github.com/mit-teaching-systems-lab/threeflows). The application is currently hosted on heroku and the URL is https://threeflows.herokuapp.com/.

The video scenarios shown on Teacher Moments are hosted on Youtube. They are publicly accessible to anyone who knows the URLs. All text responses created by participants during the simulation are stored in our private PostgreSQL database hosted on heroku. The audio responses are stored in Amazon Simple Storage Service (Amazon S3). Only authorized members of MIT Teaching Systems Lab have access to the text and audio responses. These authorized members have all undertaken MIT’s training course on human subjects research and they have received appropriate IRB approval (COUHES IRB 1607623263).

Teacher Moments was developed by MIT Teaching Systems Lab prior to the work done on this thesis. For this thesis, modifications were made to the original application in order to facilitate parent-teacher conference simulations. These changes have been merged with the original codebase and are now part of Teacher Moments deployment in production, so they are fully accessible to the public.

One problem with the current implementation of Teacher Moments is that audio recording is not supported by Safari web browser on iOS devices [16]. We hope to eventually convert Teacher Moments to a native mobile app for Android and iOS devices.
CHAPTER 5

METHODOLOGY

Considering Teacher Moments is still in an early design phase, we decided to evaluate the user experience of parent-teacher conference simulation in Teacher Moments by conducting a user study in the form of a playtest. In this chapter, we provide further details about the research questions, participants, playtest protocol, learning objectives, logistics, and the data we collected.

5.1 Research Questions

One of the main goals of this playtest was to investigate the suitability of Teacher Moments parent-teacher conference simulations for preservice teacher education by answering the following research questions:

- **RQ1:** How do users perceive the authenticity of parent-teacher conference simulations in Teacher Moments?

- **RQ2:** How do students' reflections relate to the learning objectives after completing a parent-teacher conference simulation in Teacher Moments?

- **RQ3:** How do new users perceive the ease of use of Teacher Moments interface?
5.2 Participants and Classroom Context

The playtest was conducted with students of MIT 11.125 – a preservice education class for undergraduates in the Scheller Teacher Education Program (STEP) at MIT. The students in this class, titled Understanding and Evaluating Education (11.125), are exploring teaching as a possible career, thus this class represents one intended audience for practice spaces such as Teacher Moments.

Twenty four undergraduate students were registered in the course in the spring of 2017. The class meets for 90 minutes twice a week. At the time of the playtest, all students had started K-12 classroom observations. Although 21 out of the 24 students (87.5%) completed the simulation before the class, we only analyzed the data of 12 students. We excluded data of 9 students for various reasons ranging from missing data to participants not providing consent for their data to be analyzed. Section 6.1 provides further details about the analyzed data. The researcher that led this playtest works in the same lab as the professor and this relationship was disclosed to the students in advance. The students were also informed that their participation in this playtest would not impact their class grade.

The participants were already familiar with the playtest protocol because 7 weeks before this playtest, 9 of the students in this class playtested an earlier version of Teacher Moments and we did a debrief with the entire class. Although that playtest was also a simulation of a parent-teacher conference, it was a different simulation that had a different focus and involved a different user interface i.e., an earlier version of Teacher Moments as described in Appendix A.

5.3 Playtest Protocol

The protocol we used was derived from the protocol used by Benjamin H. Dotger as described in his book [20]. One of the main differences between Dotger’s simulations and ours is that he uses trained actors who engage in a live interaction with each student while in our case, each student uses Teacher Moments to respond to a video
recording of our actor. With the exception of the group discussion questions and some of our survey questions, all other written material used in the playtest were derived from the Jennifer Turner Simulation described in Dotger's book [20, p. 84-91]. This section provides details about our playtest protocol as illustrated in the following figure.

Figure 5-1: Playtest Protocol

1. **Read background context:** The participants (in this case, preservice teachers) began by reading a five-paragraph background context about the simulation. The simulation was about Ms. Jennifer Turner, a fictional, arrogant, condescending mom who does not agree with the teacher’s assessment style and expectations of her daughter, Amber. Amber is currently in the 11th grade and the simulation participant is one of Amber’s teachers. Ms. Turner works hard to support her daughter’s modeling ambition and believes there is no need for her daughter to waste so much time on school work since she will not go to college. Ms. Turner requested for the parent-teacher conference to express her discontent with the teacher and to find out whether the teacher would be willing to provide special accommodations for her daughter.
2. **Pre-simulation teacher reflection:** After reading the background context, the teachers spend a few minutes responding to two pre-simulation reflection questions in an online form. This is where they note down their expectations about the conference and any other comments or concerns they may have.

3. **Simulation:** After completing the pre-simulation teacher reflection, they then click on a link that takes them to the simulation welcome page in Teacher Moments. The simulation consists of a welcome page, 6 video scenarios of Ms. Turner (our standardized parent) that each require an audio response from the teacher, and finally a summary page that shows all the video scenarios and the teacher’s responses.

4. **Post-simulation teacher reflection:** After completing the simulation, the teachers return to another form to complete 6 reflection questions. This is where they write down their thoughts and feelings about the simulation experience, their strengths and weaknesses in the simulation, and any point they wish to bring up in the group discussion (i.e., class debrief). They are also instructed to save the responses they write in this form and bring them along for the class debrief so they don’t have to recall information from memory.

5. **Fill survey about simulation:** After completing the post-simulation reflection, they fill a short survey about Teacher Moments and the entire experience so far. We added this step for our research so we can get their feedback. Here, we asked them questions about the pre-simulation tasks, the simulation experience, and then some questions about the user interface design. For the pre-simulation tasks, we asked whether the background context and pre-simulation reflection questions gave them adequate information and made them feel well-prepared for the simulation. This way, we can determine whether we mistakenly omitted any important information that significantly impacted their experience while adopting the simulation to Teacher Moments. As feedback about the simulation experience, we asked whether they felt the scenarios gave a good approximation of real situations they may experience in a parent-teacher con-
ference and whether they found it difficult to provide good responses during the simulation. This helped us evaluate their perception of the authenticity and difficulty of the scenarios. For the third part of the survey that focused on the user interface design, we asked whether they felt the user interface was easy to use, the things they liked or disliked about Teacher Moments, and whether they had any other thoughts or feedback about the overall experience. The aim of asking these questions was for us to gather inform about how easy it is for new users to complete a simulation in Teacher Moments. These questions could also help us identify features we may need to change or preserve in future iterations of the user interface.

6. **Group discussion:** This is essentially a class debrief facilitated by the instructor. Although Dotger's book [20] contains various points that could serve as a guide for the instructor, it is up to the instructor to take the conversation in any direction they wish. In this playtest, the instructor was given access to the students' post-simulation reflection responses a few hours before the debrief.

7. **Fill survey about debrief:** After completing the debrief, they filled a short survey about the debrief. We added this step to find out whether the students felt they learnt anything new or gained any new insight from the debrief, any suggestions they had about the format of the debrief, and any other thoughts or feedback they had about the entire process.

5.4 **Simulation Expectations and Learning Objectives**

Here are some of the main expectations and learning objectives for the Jennifer Turner simulation:

1. **Cognitive dissonance and disequilibrium:** "Cognitive dissonance refers to a situation involving conflicting attitudes, beliefs or behaviors. This produces a feeling of discomfort leading to an alteration in one of the attitudes,
beliefs or behaviors to reduce the discomfort and restore balance” [42]. Teachers experience cognitive dissonance in the early stages of their career [12]. For this reason, Dotger designs his simulations to incorporate such psychological challenges in order to provide preservice teachers with opportunities to deconstruct and evaluate approaches to such problems [20, p. 10-11]. The Jennifer Turner simulation was designed to be a difficult simulation for new teachers [20, p. 84], so we expected students to struggle with some of the prompts during the simulation.

2. Calmness in frustrating circumstances: This simulation serves as “an opportunity for teachers to practice remaining professional, calm, and reasoned when interacting with a generally disrespectful parent/guardian” [20, p. 85].

3. Articulating teaching and assessment philosophies: This simulation also provides teachers with the opportunity to practice articulating their teaching and assessment philosophies to a parent who strongly disagrees with the teacher’s philosophies and expects the teacher to make special accommodations for her child [20, p. 84-85].

5.5 Playtest Logistics and Data Collection

5.5.1 Actor and video scenarios

We used one of the staff in our lab as the standardized parent in the video scenarios. She had no prior professional acting experience or training. Although Dotger uses professional actors as standardized parents in his simulations, we used a staff from our lab mainly because we felt it would not make a significant difference to the simulation experience. Besides, our actor did not need to engage in a live interaction with the teachers, so we could afford to re-record our scenarios until we were satisfied with the outcome.

The only information provided to the actor was that she was sent a training guide (i.e., Standardized Parent Interaction Protocol [20, p. 87-89]) a day before the
recording. The recording was done in one of the meeting rooms at MIT Teaching Systems Lab. Three people were present at the recording: a videographer who came with the recording equipment, the actor playing the role of the standardized parent (i.e., Ms. Turner), and the researcher. The videographer used professional recording equipment, but he did not edit the final output, so this could have been done by anyone with any recording device or even a webcam.

The entire recording session took 20 minutes and the product was a 9-minute video clip which included all the mistakes and re-recordings. The researcher took this 9-minute video clip, cut the 6 video scenarios using iMovie (i.e., the standard video editing software that comes pre-installed) on a mac laptop, and uploaded the scenarios on Youtube (because Teacher Moments was designed to play Youtube videos). The 6 video scenarios were of varying length. The shortest scenario was 5 seconds while the longest was 28 seconds. The total length of all 6 scenarios was 78 seconds i.e., an average length of approximately 13 seconds per scenario.

5.5.2 Simulation

Two days before the simulation discussion, the professor assigned the simulation and survey as homework for the students in the class. Students were asked to complete steps 1-5 of figure 5-1 (i.e., everything before the debrief) as homework. Students were sent a link to an online form which contained all the information they needed, including a link to Teacher Moments.

5.5.3 Debrief

The professor led a 30 minute debrief for the activity in the final 30 minutes of the class period. At the start of the debrief, each student was given a printout of the responses they filled in during the post-simulation teacher reflection. These printouts varied in length from half a page to a full page based on how much information they wrote during their reflection. Although students were initially asked to save these responses and bring them to class, we decided to provide them with a printed copy.
just in case some students forgot to bring their printout. During the debrief, students were asked to break into small groups of three to five individuals. The instructor asked a question about the simulation and the students discussed the topic first in their small groups. After discussing each topic for a few minutes, each group had to share some of the things they discussed with the entire class. Students also had the opportunity to ask questions about the activity that were answered by other students or the instructor.

5.5.4 Data collection

All recordings done on Teacher Moments were captured by the web browser and sent to our server. The server also records the timestamp and session identifier at various key points such as the moment a video scenario finishes playing and the moment we receive a recorded response. Collecting these data allows us to detect if a participant pauses or restarts the simulation, and to link together a participant’s audio recordings with their pre and post simulation survey responses. Due to the fact that we ran out of time in class, some of the students completed the final survey (step 7 of figure 5-1) a few hours after the class.
6.1 Demographics and Excluded Data

We analysed the data of 12 students (2 male and 10 female) who are currently at different levels in their undergraduate degree program ranging from 1st to 4th year. Their majors vary from undeclared major to economics and STEM courses. Based on their survey responses, none of the student teachers had any prior conversation with a parent/caregiver about a student in their class. Thus, this experience represented a novel experience for the student teachers. Attrition of 12 out of the original class of 24 students was the result of a few reasons. 2 students were excluded because they did not give their permission in the consent form. 2 students were excluded for not having done the simulation. 6 were excluded for not filling the survey. 2 were excluded because we could not hear their audio recordings as a result of a faulty laptop microphone.

In the following analyses, unless stated otherwise, we excluded data for the first response each user produced. We did this because the first video scenario was added as a simple introduction to get the user acquainted with the interface. In the first video scenario, Ms. Turner simply introduces herself and awaits a response from the
6.2 Simulation Authenticity

In this section, we examine the evidence with the goal of answering our first research question (RQ1): How do users perceive the authenticity of parent-teacher conference simulations in Teacher Moments?

6.2.1 Investigating Authenticity From Survey Responses

In response to one of the survey questions, 11 of the 12 students either agreed or strongly agreed that the simulation gives a good approximation of difficult situations they may experience in a parent-teacher conference. Such high levels of agreement matched our expectations because Dotger sourced his scenarios by interviewing over 70 experienced teachers [20, p. 13-14] and this simulation, in particular, was designed to be a difficult simulation [20, p. 84]. In response to another survey question, 10 of the 12 students either agreed or strongly agreed that the interaction with Mrs. Turner felt realistic. One of the subsequent questions in the survey gave us further insights into why the simulation felt realistic. In that question, we asked “Are there any specific things you liked about Teacher Moments?” Various students mentioned being able to see a video of Ms. Turner and being able to record their response immediately the video ended as two features that contributed towards the realistic feel of the simulation. For example, here are some quotes from students that highlighted the video scenarios and the automatic start of the audio recording as features that contributed towards the authenticity of the simulation:

“I liked that the recordings started automatically, as if we were in a real conversation”

“I like the video recordings and the ability to get body language and tone from Mrs. Turner. It made it feel much more real for me as a user.”
Despite the authenticity afforded by the video scenarios and automatic start of the audio recordings, students voiced two common complaints about the audio recording.

The first complaint was from two students said they would have preferred to be told in advance that the recording would begin as soon as the video ended. They assumed the “done” button (shown in figure 4-3) was the button to start the recording. We anticipated that some students would have to learn how to interact with Teacher Moments before the playtest so we included an extra recording at the beginning to familiarize the user with the interface. The first recording was simply an introduction between Ms. Turner and the participant. It did not provide users with any information or feedback that could alter the rest of the simulation. We expected participants to use that first recording to familiarize themselves with the interface, so students who skipped that recording may not have been familiar with the audio recording interface until the second recording.

The second complaint about the instant audio recording was that one of the participants said they found it stressful to have to record responses without having much time to think through the situations. Although this was phrased as a complaint, this is actually what we expected. The simulation was designed to be challenging for someone who has no prior experience with the scenarios. In a different survey question, we asked the students if they found it difficult to provide good responses to Ms. Turner during the simulation. 8 of the 12 students agreed or strongly agreed, while the remaining 4 students disagreed that they found it difficult to provide good responses to Ms. Turner.

One final point about the survey responses related to authenticity is that there was no complaint about the actor in spite of the fact that she had no prior professional experience. Although we had to do multiple recordings of some of the scenarios before getting it right, this was still a much lower investment than having to recruit and train a professional actor to engage in a live simulation.
6.2.2 Investigating Authenticity From User Behavior

There are various ways a user's behavior could undermine the authenticity of the simulation. For example, a user could simply refresh their browser and restart the simulation if the conversation is not going well or a user could decide to spend one minute crafting their response before speaking. After all, they had to do this as a homework and there was no one watching them. In this section, we discuss some of the investigations we made to validate actual user behavior with regards to authenticity of the simulation.

Unusual Silence, Pauses or Restart

First, we checked the session data on our server to see whether any of the users restarted the simulation after producing a couple of responses. Although 3 users restarted the simulation once, they did this before producing their second response. Since there were five other scenarios they did not see before the restart, we believe this could not have had any major impact on the authenticity of their simulation experience. We did not conduct a follow-on interview so we do not know the exact reason why they restarted the simulation. We excluded the recordings from their first session in all subsequent analysis unless stated otherwise.

After checking the session data, we then listened to all the recordings to check for excessive pauses or anyone breaking character and restarting their response in a manner that would not happen in a normal conversation. We did not notice any break in character or restart during any of the responses. Besides, the user started speaking within 5 seconds in all (except one response) and within 3 seconds in 90% of all responses. There was one case where the user skipped the fourth scenario i.e., they simply clicked "done" without recording any response. Since all the other responses from this user were fine, we believe the user may have intentionally skipped this scenario, especially considering it was one of the most difficult parts of the simulation. We recognize this as a potential disadvantage of not using a live actor i.e., the user could compromise the authenticity of the experience by choosing to ignore the most
difficult scenarios.

Although we hid the video controls in the Youtube player to prevent the user from compromising the authenticity of the experience by rewinding or pausing the video scenarios midway, we forgot to disable the functionality that allows the user to pause the video by clicking on the screen. We only realized this after the playtest, so we checked the logs to see whether any user paused the video during the simulation. Since there were no event handlers to explicitly check for this, we tried to figure this out by finding the time difference between the time the last response was submitted and the time the current scenario finished playing. We then compared this time difference with the expected length of the current scenario. This calculation is not entirely accurate because it does not account for the loading time of the Youtube video and the latency between the user’s computer and our web server. After subtracting 2 seconds to account for the Youtube video loading time and latency\(^1\), we discovered that there were 8 instances where the user seemed to have paused the scenario for more than 5 seconds. The two longest pauses were for 381 and 125 seconds respectively. Excessive pauses turned out to be the most common way the authenticity of the experience was compromised. Over half of these long pauses were from two users and one of them seemed to have paused the video on three separate occasions.

**Conversation Style**

After looking through the timestamps and other log entries, we then listened to all the audio responses to check whether there were any unusual responses to indicate that the users did not take the exercise seriously. Except for the one user that skipped one of the responses as mentioned earlier, all the other audio recordings sounded like genuine responses to the video scenarios. By ‘genuine’ we mean that participants all made attempts to address the concerns Ms. Turner raised in the videos, they addressed her like she was a real person in front of them, and some of them requested to meet with her and the principal when she threatened to take her concerns to the

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\(^1\)We subtracted 2 seconds because it was the median and mode of all the calculated time differences between the length of the video scenarios and how long it took users to watch the scenarios (based on calculations from our server timestamps).
Amongst all the responses we reviewed, there were two users that directed questions to Ms. Turner in a manner that seemed like they expected a response from her. In both cases, the users asked the questions in their response to the first scenario and they both restarted the simulation after listening to the second scenario. Only one of them repeated their initial questions after restarting the simulation. The fact that there were only few questions which all occurred in users’ first responses might be an indication that users may have crafted their responses with the view that they will not get adequate replies to any of their questions. As a result, they may have responded in a manner that is different from how they would respond to a real person in front of them. Exploring the difference between users’ responses when interacting with a real person versus a pre-recorded video is a topic for future research.

In summary, although the users felt the simulation was authentic, we believe the interaction could have been more authentic if there was some type of branching or variation in the scenarios based on the user’s questions or responses.

### 6.3 Relationship Between Students’ Reflections and Learning Objectives

Some of the expected benefits of an interactive multimedia simulation are that it should get students to focus on specific problems of teacher practice and also get them to challenge and reflect on their own pedagogical skills [46][10]. For these reasons, we examine the evidence with the goal of answering our second research question (RQ2): How do students’ reflections relate to the learning objectives after completing a parent-teacher conference simulation in Teacher Moments?

We analysed students’ responses to the post-simulation reflection questions and the survey responses submitted after the class debrief. Students had access to their recorded responses (and were encouraged to refer to it) while filling the post-simulation responses as part of the homework. After analyzing the responses, the three most
common themes that emerged in students' reflections were related to:

- Cognitive Dissonance and disequilibration
- Articulating rationale for grading/assessment
- Emphasis on remaining professional, calm, and reasoned

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Table 6.1: Common themes amongst students' post-simulation reflection and survey responses

6.3.1 Cognitive dissonance and disequilibration

This was one of the two most common themes amongst the students' responses. 8 out of the 12 students said they found it difficult to respond at various points in the simulation. This is in line with our expectation (as stated in section 5.4) because this simulation was designed to be a challenging experience for new teachers. One moment of disequilibration for students was the realization that Ms. Turner seemed to have low academic expectations of her daughter. For example, one student asked: “What do you do when someone disagrees with you on something you took to be self-evident (for example: having high expectations is good)?”. Two other scenarios that caught students off guard were the scenario in which Ms. Turner implied that the teacher may not understand how things are done because the teacher is new, and the scenario where Ms. Turner said she would take the matter to the principal. Some students were unprepared for a situation in which their lack of experience gets used against them by a parent in a condescending manner during a parent-teacher conference. Some
others did not know how to respond to a parent's request to take the matter to the principal. These evidences of cognitive dissonance and disequilibration in students' reflections indicate that the simulation achieved the objective of getting students to experience and reflect on moments of cognitive dissonance and disequilibration that could occur in a difficult parent-teacher conference.

6.3.2 Articulating rationale for grading/assessment

One of the learning objectives of this simulation was to get students to practice articulating their teaching and assessment philosophies to a parent that may not agree with them. This was another of the two most common themes amongst the students' responses (8 out of 12 students). Some students felt they did a good job of sticking to their philosophies and clearly communicating to Ms. Turner that they were not going to change their grading just for her daughter. For example, one student commented that "My strengths were remaining calm while thoroughly explaining my approach in the best way possible. I was also good at standing my ground." Some others were not sure how to respond or how their response would have been perceived by Ms. Turner, especially after Ms. Turner said (in a condescending manner) that she has been a teacher before. As an example, one student wrote: "I was caught a bit off guard when Mrs. Turner said that she was herself a teacher, and my response had a "well this is well-known and researched pedagogy" tone which would probably be off-putting...". The prevalence of this theme in the students' reflections suggests that the simulation achieved the goal of getting students to practice and reflect on the way they articulate their teaching and assessment philosophies.

6.3.3 Emphasis on remaining professional, calm, and reasoned

One of the main learning objectives of this simulation is to serve as "an opportunity for teachers to practice remaining professional, calm, and reasoned when interacting with a generally disrespectful parent/guardian"[20, p. 85]. Our findings indicate that the simulation in Teacher Moments helped students achieve and focus on this learning
objective. As illustrated in table 6.1, 7 out of the 12 students focused on this learning objective in at least one of their reflection responses. Some of the students felt being professional, calm, and reasoned was one of their strengths during the simulation. For example, in response to the reflection question that asked about their strengths in the simulation, a student responded: “I believe my strengths were in staying calm and kind toward Mrs. Turner throughout the scenario. When Mrs. Turner would tell me that my way of teaching was wrong, I was level-headed and calmly explained my side”. Unlike this student, not all students felt they were professional, calm, and reasoned throughout the simulation. Some students identified this as an area where they need to improved. For example, when asked whether the simulation highlighted any professional skills or dispositions they need to improve, one of the students responded: “I think I could be better at responding when caught off guard. After Mrs. Turner mentioned me being a new teacher in a condescending manner I was pretty caught off guard and my response to her was not as well thought out ...”.

The prevalence of this theme in students’ reflection is evidence that the simulation successfully helped students to focus on this learning objective by getting them to practice and reflect on their ability to remain professional, calm, and reasoned when dealing with a disrespectful parent.

6.3.4 Conclusion on main themes in reflection and debrief

The main themes we observed in the students’ reflection notes and survey responses were aligned with the simulation learning objectives, even without explicitly telling the students the learning objectives in advance. For this reason, we were able to conclude that our implementation of the simulation in Teacher Moments facilitated students’ focus and reflection on the learning objectives.

6.4 Ease of use of Teacher Moments Interface

In this section, we examine the evidence with the goal of answering our third research questions (RQ3): How do new users perceive the ease of use of Teacher Moments
There were 4 survey questions related to this research question. The first question was whether users felt the user interface of Teacher Moments was easy to use. The second and third questions asked users to mention any specific things they like or dislike about Teacher Moments. The fourth question asked about any other thoughts or feedback they have about Teacher Moments or the overall experience.

11 out of the 12 students either agreed or strongly agreed that the user interface of Teacher Moments was easy to use. When asked about the specific things they liked about Teacher Moments, the instant recording (without having to click a button) and the fact that we used video scenarios where the two most common comments about the user interface. These responses indicate that many users understood and found it easy to use these features. When asked about the specific things they did not like about Teacher Moments, there was no comment about the user interface. However, for the final question that asked about other thoughts or feedback, 2 of the 12 students mentioned that they mistakenly skipped the first recording by clicking the “done” button. When we checked the audio files, we noticed that 4 of the 12 students actually skipped the first recording. Although we anticipated this behavior and minimized its impact on our analysis by including an additional first recording which we hoped to ignore, it was not obvious to the users that the first recording was meant to be considered a test recording. The fact that some users mistakenly skipped the first recording gave us an indication that we need to make it more intuitive for new users to realize that the audio recording would automatically begin immediately after the video scenario ends.
7.1 Teacher Moments as a Pedagogical Tool in Teacher Education

Over the years, teacher educators have adopted different approaches in their curriculums and program structure to expose preservice teachers to diverse problems of teaching practice and to bridge the gap that often exist between campus courses and field placements [54] [14]. These approaches include role plays, interactive multimedia or video case studies, clinical simulations, and computer-based simulations [20][33][54][23].

There is no single best way to structure the curriculum or learning experiences in teacher education programs [14]. Factors such as financial cost, time constraints, available capacities, location, administrative support, regulation, and pedagogical preferences could influence the curriculum and design of teacher education courses [20][33][30]. For example, programs located close to medical schools and clinical skills centers could favor clinical simulations as a pedagogical approach, while programs located in rural areas may resort to using online multimedia case studies as a means to exposing their students to diverse populations.
Based on our research results, we identified several affordances that make Teacher Moments useful as a low-cost simulation platform for facilitating practice-based pedagogy in preservice teacher education. These affordances include:

- **Providing a shared simulation experience for class debriefs:** 21 out of the 24 students (87.5%) in 11.125 completed the simulation before the class. This meant that they all had a shared experience about Ms. Turner and the scenarios before the class debrief. As a result, the instructor was able to dive into the debrief without having to spend any extra time explaining the background context. Throughout the debrief, there was no observed evidence of students getting confused about any of the scenarios or the background context.

- **Giving the instructor the ability to focus student teachers’ attention on specific challenges of teaching practice:** Throughout the course of the debrief in 11.125, we observed that students were focused and engaged with the learning challenges of teaching practice presented in the scenarios. The core themes that emerged in students’ reflections matched the learning objectives mentioned in section 5.4. It is worth noting that it is still the responsibility of the instructor to choose/design appropriate scenarios that match the class learning objectives. It is also the instructor’s responsibility to call out specific cases during the debrief in order to get the students to reflect on them. Before recording the scenarios we used in 11.125, the researcher and the class professor went through various simulations created by Dotger [20] in order to select a scenario that matched the learning objectives for the class.

- **Providing student teachers with recorded data to guide their reflection and self assessment of their skills:** All simulation responses are recorded by Teacher Moments and they get displayed to the user in the summary page at the end of the simulation. This data is useful for personal reflection and also during class debriefs as a means of getting feedback from colleagues and instructors. Although we did not ask students to play their videos in class (due to time constraints), the notes they wrote down during the post-simulation re-
flection (while they had access to their recordings) served as points of reference during the class discussions. There was evidence to show that some students found those notes useful. For example, in the final survey after the class debrief, we asked students “Did you learn anything new or gain any new insight from the post-simulation debrief in class?”. One of the student’s response was: “I was able to see other answers from students that I would have considered giving myself. It made me think about how I might respond differently in the future”. Another student responded that “It was interesting to see how many people had similar challenges, and how many came up with different solutions than I had”.

- Providing instructors with information about each student teacher’s strengths and weaknesses: In the post-simulation reflection survey, students were asked to write about their strengths and weaknesses in the simulation, and describe portions of the simulation where they exhibited those strengths and weaknesses. While reflecting on these questions, they had access to the summary page so they could replay the videos scenarios and their audio responses if required. These responses were shared with the instructor a few hours before the class so she had the opportunity to incorporate them in her lecture and debrief plan.

Although Teacher Moments makes it easier for anyone to implement and disseminate simulations to a wide audience, there are two important points that are worth bearing in mind. The first is that although it may be easy to implement simulations in Teacher Moments, the process of developing useful scenarios that authentically approximate aspects of teaching practice and provide valuable learning experience is not a trivial task [20, p. 55]. Teacher Moments, could also be used in the development process as a low-cost means of trying out scenarios during the design and iteration process. The second important point is that reflection, debrief, and repeated practice are necessary components for maximizing the learning outcomes of simulations [20][27]. Although, it may not be necessary for teachers to repeat one simulation multiple times in order to accomplish a learning objective, it is worth noting that the
first time a user experiences a new type of simulation, the novelty of the experience could undermine the learning outcomes [20, p. 55].

7.2 Teacher Moments User Interface Improvements

One way to rectify the two identified problems of Teacher Moments user interface (i.e., users mistakenly skipping the first audio recording and users unknowingly advancing through the entire simulation with a faulty microphone) is by providing users with a test page before each simulation. The test page should enable users to create and listen to their audio recording as many times as they wish before beginning the simulation. That way, users will be able to test their microphone and speaker before beginning the simulation. Users may need to create and listen to their sample recording multiple times if there is something wrong with their microphone or speaker, hence the need for the page to allow multiple recordings. Further design iterations and usability studies would be required in order to fully flesh out the user interface design and implementation details of such a page.

7.3 Limitations of the Study

One major limitation of this student is that most of the students in 11.125 were just using Teacher Moments for the first time, so the novelty of the platform may have affected the learning experience. For this reason, it is difficult to reach strong conclusions about the effects of the simulation, reflection and debrief on students’ learning. A second limitation of this study is the small sample size of 12 students. And a third limitation is that students did not have access to their audio recordings during the debrief, so they had to rely on their memory and the notes they took during the post-simulation reflection.
8.1 Branching Scenarios

We eventually need to implement branching in video scenarios so users can experience different outcomes based on their responses during the simulation. Although we currently have some text scenarios in Teacher Moments that include branching logic (as illustrated in figure A-4), we need to carry out further usability studies to investigate and hopefully eliminate the usability problem we noticed in the branch page. The page currently provides users with a list of options and requires them to select the option that closely matches their previous response. When we tested that page in a playtest, instead of quickly selecting an option that matches the user's previous response, one of the students thought the options in the branching page were examples of good responses and she thought the page was included to encourage reflection during the simulation.
8.2 Teacher-Initiated Parent-Teacher Conferences

Without implementing branching, it would be virtually impossible to implement teacher-initiated conferences or scenarios that require the teacher to solicit information from the standardized parent (i.e., the video recording) in Teacher Moments. We need to conduct further research with teacher-initiated conferences (after implementing branching) to investigate the authenticity of such simulations in Teacher Moments. Simulations that involve branching would typically require more recordings than simulations with linear scenarios. In addition, the developers of branching scenarios would need to map out a set of possible pathways for the evolution of the simulation. This is one area where real actors potentially have an advantage over video recordings. With real actors, you can rely on the actors to improvise if the teacher says something unexpected or attempts to steer the conference towards an unanticipated path.

8.3 Sharing Responses

Whenever we ask users for suggestions about how we can improve Teacher Moments, one of the common requests we get is that they would like to see other people’s responses to the scenarios. Here are some of such responses:

"I think it would be very valuable to share the responses people have and try to highlight the ideas that people like the most."

"Listening to other students’ responses might be useful."

We need to carry out further research with educators, preservice teachers and inservice teachers in order to flesh out the details of sharing responses. For example, while some users may be interested in seeing the responses of other teachers in their cohort, others may want to see examples of good responses produced by expert teachers. There are other factors we need to consider such as user consent and the potential impact of such content on student reflections and group debriefs.
8.4 Authoring Interface

Although Teacher Moments has a graphical user interface for creating scenarios, this interface needs to be updated to cater to the new format of video scenarios we used in the Jennifer Turner simulation. In its current state, such video scenarios can only be created by software developers who understand the codebase.
In recent years, teacher educators have been exploring simulations as a means of facilitating practice-based pedagogy, augmenting field placements, and enhancing various aspects of teacher education [33][22][43]. Although simulations are well-established as tools for facilitating teaching, learning and assessment in other disciplines, the use of simulations in teacher education is still relatively uncommon [33][25][8][44]. Some of the reasons for the slow adoption of simulations in teacher education include the financial cost of acquiring the required technology and personnel, the time required to develop or source simulations, logistic challenges involved in coordinating clinical simulations, and educators’ reluctance to changing their teaching approach [20][33].

We believe that a simulation platform like Teacher Moments could serve as a low-cost platform for disseminating clinical simulations as a pedagogical approach for teacher education. Teacher educators can try out various simulations on Teacher Moments without having to purchase any special equipment or commit significant resources upfront. The only equipment required is an internet enabled device with a web browser.

This thesis draws upon an ongoing design based research project to investigate and improve the suitability of Teacher Moments as an online simulation environment for
practicing parent-teacher conferences in preservice teacher education. We conducted a playtest with students of a preservice education class to investigate the perceived authenticity of a parent-teacher conference simulation in Teacher Moments, the main themes that emerge in students’ subsequent reflections and class debrief, and improvements that could be made to enhance the user experience of Teacher Moments simulations.

Having investigated the simulation authenticity from the users’ survey responses and usage data captured by Teacher Moments, we discovered that although the students felt the simulation experience was authentic, there are some improvements that could be made to the user interface in order to limit users’ ability to compromise the authenticity of the simulation experience. One of the main improvements is that we need to disable the feature that allows users to pause the video scenarios during the simulation. In the current implementation, the video scenario gets paused if the user clicks on the video while it is playing.

When we analyzed students’ individual reflections, we noticed 3 main themes:

3. Emphasis on remaining professional, calm, and reasoned.

These themes matched our expectations and the simulation learning objectives, thereby indicating that the simulation succeeded in getting students to focus and reflect on these learning objectives.

Based on our research results, we identified several affordances of Teacher Moments that make it useful as a low-cost simulation platform for facilitating practice-based pedagogy in preservice teacher education. These affordances include providing a shared simulation experience for class debriefs, giving the teacher educator the ability to focus student teachers’ attention on specific challenges of teaching practice, providing student teachers with recorded data to guide their reflection and self-assessment of their skills, and providing instructors with information about each student teacher’s strengths and weaknesses.
In this appendix, we will first provide a brief description of two earlier playtests that influenced our design decisions during the evolution of this project. After that, we will describe changes we made to the user interface that facilitates parent-teacher conference simulations in Teacher Moments.

A.1 Previous Playtests That Influenced our Design Decisions

Prior to the most recent playtest we did in MIT 11.125 (which this thesis focuses on), there were two previous playtests that influenced a lot of our design decisions regarding parent-teacher conference simulations in Teacher Moments. In this section, we present a brief description of those two previous playtests and some of our main findings.
A.1.1 Classroom management simulation

In October 2016, we conducted a playtest with a mixed group of 10 preservice and inservice teachers to investigate how they use Teacher Moments to provide text and audio responses to text descriptions of classroom scenarios. In this playtest, teachers were required to respond to inappropriate student behaviors in 12 different classroom scenarios. The participants were split randomly into 2 cohorts (A and B) and the 12 scenarios were split into 6 blocks of 2. Each participant alternated between text and audio interfaces when responding to each of the 6 blocks of 2 scenarios i.e., 2 text responses, followed by 2 audio responses, followed by 2 text responses, etc. All scenarios were presented in the same order to all participants. However, cohort B participants provided audio responses to the scenarios that cohort A provided text responses and vice versa.

One of the main findings from this playtest was that several participants complained about getting lost in the simulation because they sometimes lost track of the context. In addition, they often felt they did not have sufficient information about their prior relationship with each of the students presented in the scenarios.

We quickly realized that having well-developed scenarios that situate the teacher in one clearly defined context is an essential part of the user experience in the simulation. In order to address this complaint, we decided to use scenarios that situate the teacher in one clearly defined context. For the next playtest, we decided to focus on parent-teacher conferences because we had access to a book (titled "I had no idea: clinical simulations for teacher development" [20]) that provided us with well-documented scenarios about parent-teacher conferences that situate the teacher in one clearly defined context. Besides, parent-teacher conferences is an area where many preservice teachers complain about having inadequate preparation and formal training [36][24].

A.1.2 Lori Danson simulation

In February 2017, we conducted a playtest with a mixed group of 16 preservice and inservice teachers to investigate how teachers use Teacher Moments to respond to
scenarios in a simulation of a difficult parent-teacher conference. For this playtest, we adapted Lori Danson simulation from Dotger’s book titled “I had no idea: clinical simulations for teacher development” [20, p. 108-115]. This is a simulation about a mom who initiated a parent-teacher conference to advocate for her son who has autism and will soon be joining the teacher’s class as a new student in the district. For this simulation, the scenarios were presented as text while participants had to produce audio recordings of their response. We received lots of positive feedback from this playtest and users felt the simulation was a good way to practice their responses to difficult scenarios they may experience as teachers.

In addition to the positive feedback, we also received some suggestions for further improvement. The most common suggestion we received was that users wanted a more visual representation of the scenarios. This feedback was part of the main reasons why we decided to try video scenarios in the third playtest which is the main focus of this thesis.

A.2 Design Iterations

In this section, we will talk about some of the features that were modified based on user feedback from the two playtests described earlier in this appendix.

A.2.1 Text or audio response

In the earlier classroom management simulation, we got participants to alternate between text and audio interfaces while responding to different scenarios about classroom management. Users claimed audio responses felt more realistic even though it was more uncomfortable compared to text. While producing text responses, users had more time to think and come up with better phrasing of whatever they wanted to say.

Although participants were able to produce better written responses than verbal responses, we recognize that in real-life situations, teachers will not have much time to think about their response. They need to respond in the moment. One of our
After lunch, you come back to the room and see someone took down the color chart or homework chart and threw it on the floor. It is not clear who did this. How would you respond to the class?

It's rug time. You transition the class to the rug. One student refuses to leave his seat and starts yelling, but negative comments, "I hate this class. The work we do is stupid." How do you respond to the student?

Figure A-1: Screenshots of text (left) and audio (right) responses to text scenarios

goals was to make the simulation feel as realistic as possible by allowing them to experience the kind of discomfort they will feel if faced with such situations in real life. We also wanted participants to become more aware of their strategies (or lack of strategy) and communication style while dealing with such difficult situations under realistic conditions so they can identify areas where they need to improve. For these reasons, we decided to implement only audio responses for the parent-teacher conference simulations.

A.2.2 Timer or instant recording

In the classroom management simulation, we included an instruction in the first page that users should aim to respond to each scenario in about 90 seconds and we included a timer on each response page to create a sense of urgency. Our goal was to simulate a sense of urgency to get users to respond immediately like they would do in a real conversation. This did not work as expected for various reasons. Some users said the timer was annoying and they did not understand its purpose. Some users did not
Welcome!

This station is about responding to students in the moment. It is set in the context of a 7th grade classroom.

This may feel uncomfortable at first, but it’s better to get comfortable here than with real students.

You may be asked to write or say your responses aloud.

Each question is timed to simulate responding in the moment in the classroom. Aim to respond to each scenario in about 90 seconds.

Figure A-2: Screenshots of timer instructions (left) and the timer (right) that gets displayed while a user is responding to a scenario

like the idea of getting timed while reading the scenarios because it distracted them and made them rush through the readings. Some others said they simply ignored the timer after realizing that there was no consequence for spending more than 90 seconds on any scenario. If a user spent more than 90 seconds, the timer simply continued counting. We had no easy means of determining how much time users should spend on each scenario, especially considering this depends on not just the nature of the scenario but also on the user’s reading and typing speed. For these reasons, we got rid of the timer. When we switched over to video scenarios, we eventually decided to simulate the sense of urgency by beginning the audio recording as soon as the video scenario ended rather than allowing the user to decide when they are ready to start speaking. We also included a couple of visual elements (illustrated in figure 4-3) to ensure that this instant capture of the user’s response is obvious to the user.
A.2.3 Preventing multiple responses

We initially presented the user with a review page after each of their recordings. This page can be used by users to confirm that there were no technical glitches in their recording and it could also be beneficial for certain kinds of rehearsals where the goal might be to craft a good response after multiple attempts. This page had detrimental effects in the parent-teacher conference simulations. When we playtested our first parent-teacher simulation (i.e., the Lori Danson simulation), we noticed that some users routinely listened to their recordings and did multiple retries if they did not like the first recording. This broke the flow in the conversation, thereby making the simulation feel less realistic. It also resulted in the loss of useful information that could have potentially led to good discussion topics and learning opportunities during the post-simulation debrief with peers and the instructor. For these reasons, we decided to get rid of this review page.

Figure A-3: Review page that allows the user to play or re-record their response before advancing to the next scenario
A.2.4 Branching scenarios

In the Lori Danson simulation, we experimented with the idea of allowing the scenarios to branch off in different directions based on the user’s response. We implemented this by displaying a page (illustrated in figure A-4) which requires the user to select the option that is closest to their previous response. Although this feature still exists in Teacher Moments, we did not included it in the next parent-teacher conference simulation (i.e., Jennifer Turner simulation) because we felt we could achieve the learning objectives of the simulation by implementing a linear sequence of scenarios.

It is worth noting that when we had this branching page, one unintended effect was that a student misinterpreted it as a reflection page. She thought this page was included to display a sample of good answers in order to encourage student reflection at that point. Such reflections actually compromise the authenticity of the simulation.
experience because in reality, teachers will not have much time to pause and reflect in the middle of a parent-teacher conference. We need to perform further research and design iterations on the branching page to ensure that it does not mislead students.


Farkhunda Rasheed Choudhary, Misbah Rasheed Choudhary, and Sufiana Kha-


