TOWARDS THE GROWING EDGE: INTEGRATING SIMULATION IN A GENETIC COUNSELING GRADUATE PROGRAM

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ABSTRACT

Simulation is a well-established learning practice in medical education; however, it is not well studied in genetic counseling. The current study utilizes action research to document and describe the implementation of a simulated patient (SP) program into the Joan H. Marks Graduate Program in Human Genetics curriculum. With the standards of genetic counseling training now including simulated patient encounters as participatory cases (ACGC 2019 and 2020), the utilization of SP methodology can be expected to grow. The goal of the study was to explore specific considerations of simulation in genetic counseling while meeting the standards of best practice laid out by professional simulation organizations. Over the course of the study, a model of simulation implementation was developed and over two hundred and seventy simulation sessions were implemented. Key themes of successful implementation were identified, including co-creation within the team - building as we go; developing a formative holding environment that is learner-centered; workshopping - maximizing the unique aspects of simulation; and pushing towards the growing edge while bridging theory to practice. The study contributes a thick description of implementing a simulation program with the aim of catalyzing a robust community of practice of healthcare simulation in genetic counseling education.

Key words: Simulation-based Education, Simulated Patient, Simulation Program Development, Genetic Counseling, Healthcare Simulation Practice, Humanism, Learner-Centered, Self-Directed Learning.

Towards the Growing Edge: Integrating Simulation in a Genetic Counseling Graduate Program

While simulation is a well-established learning practice in medical education, it is not well studied in genetic counseling. The COVID-19 pandemic interrupted many education programs – particularly clinical training components – and introduced a dynamic context for learning that was ripe for experimentation. The ever-changing restrictions arising to protect the public health led to the cancellation of fieldwork in many allied health fields, including genetic counseling. With the persistent uncertainty of the length and nature of disruptions to clinical training due to the pandemic, many graduate programs are seeking new and innovative ways to supplement reduced time in clinic so students can continue building professional knowledge and skills, with simulation as a prominent and popular alternative. The current study utilizes action research to document and describe the implementation of a simulated patient (SP) program into the Joan H. Marks Graduate Program in Human Genetics curriculum. As genetic counseling graduate programs explore simulation, each will utilize simulation according to its own needs and resources. The current study documenting implementation of a single simulation program is offered with the intention that healthcare simulationists in genetic counseling can build upon such studies to find synergies across programs of simulation practice.

Background

Simulated patient (SP) methodologies have been used in medical education for over fifty years (May et al., 2009). The body of literature regarding SP methodology in medical education incorporates best practices from adult learning, instructional design, clinical standards of care, evaluation, and simulation pedagogy (INACSL, 2016). There is ample evidence in the literature regarding the effectiveness of simulation and incorporation of simulation modalities within medical education (Hayden et al., 2014; May et al., 2009; Cantrell & Deloney, 2007; Cleland et al., 2009; Hayden et al., 2014; LeBlanc et al., 2011; McGaghie, 2010; Nestel et al., 2015; Howley et al., 2013; Kuhne et al., 2020; Okuda et al., 2009). The incorporation of SP methodologies into any new learning paradigm, for example genetic counseling education, must evaluate the strengths of the simulation literature to learn from best practices and avoid well documented limitations. However, there are weaknesses in the literature on the topic of simulated patient methodology, particularly in a lack of transparent and replicable methods when setting up a new simulation program

(Howley et al., 2008). Genetic counseling has been slow to adopt the methodologies of simulation, at least as evidenced by limited literature. However, the COVID-19 pandemic brought increased attention to simulation such that building the literature of simulation in genetic counseling will be imperative as this methodology continues to be enacted by graduate genetic counseling programs. A broad literature review of existing studies, articles, and best practices in other allied healthcare fields and the simulation community was conducted to inform further implementation of simulation in the context of genetic counseling training.

The Society for Simulation in Healthcare (SSH) literature defines simulation as a technique that creates a situation or environment to allow persons to experience a representation of a real event for the purpose of practice, learning, evaluation, testing, or to gain understanding of systems or human actions (Lioce et al., 2020). It is helpful to review terms when two different practices merge, in this case that of simulation and genetic counseling. For the purpose of this study, the terms "genetic counseling graduate program" (or "graduate program" for short) will refer to the particular genetic counseling graduate program that is developing a simulation program. In this case, the Joan H. Marks Graduate Program in Human Genetics will be referred to as the "graduate program." The "simulation program" will be defined as the particular educational intervention designed to implement simulation within the graduate program. "Clinical training" will refer to the process of educating genetic counseling graduate students, while "training a case" or "training a role" will refer to developing a particular simulation case or simulation role within the simulation team. The team of healthcare simulation practitioners (or "simulation team") will be anyone working to implement simulation within the curriculum of the graduate program. A "session" is the single meeting of a learner, a facilitator, and an SP to work on a simulation case. Within that session there can be a "prebrief" where goals of the session are discussed between the learner and facilitator, an "encounter" between the learner and the simulated patient, and a "debrief" following the encounter when the learner, SP, and facilitator process and reflect on the experience. There are two dictionaries providing agreed upon nomenclature for simulation (Lioce et al., 2020; Meakim et al., 2013). The emerging term "simulationist" is used when describing a number of interdisciplinary health professionals involved in providing simulation activities, including simulated patient educators, operators, trainers, faculty, staff, program management, facilitators and standardized or simulated patients (Kardong-Edgren, 2013; Lioce et al., 2020). For a more in-depth examination of simulation terminology please see the appendix table of

common simulation definitions and nomenclature (see Table V). The term SP can have a number of different connotations, including simulated participant, simulated patient, or standardized patient – depending on the philosophy and needs of a particular simulation program. The Association of Standardized Patient Educators (ASPE) standards of best practice define "simulated participant" (SP) as a well person carefully trained to portray another individual including patients, family members, research participants or health professionals for educational or assessment purposes (Lewis et al., 2017). There is some disagreement over the term "simulated patient" versus "standardized patient," and each program must make their own decision on the definition that best fits their learning objectives and educational intervention (Churchouse & McCafferty, 2012; McNaughton & Anderson, 2017). "Standardized patient" appears to be utilized most for high stakes evaluation as a standardized approach allows for summative experiences, whereas the emerging literature of formative simulation experiences appears to embrace "simulated patient" or "simulated participant" (Churchouse & McCafferty, 2012; McNaughton & Anderson, 2017). Park et al. have called for use of the term "healthcare simulation practice (HSP)" as a distinct professional practice, particularly in response to the intensified uptake of simulation methodologies by many institutions during the COVID-19 pandemic (2020). Pivoting to simulation in response to a crisis without examining its definitions, key assumptions, principles, methodologies, and standards of best practice can lead to poor outcomes and a weakening of healthcare simulation practice (Park et al., 2020).

At its core, healthcare simulation practice is interdisciplinary and demands interprofessional collaboration. Simulationists come from a wide variety of backgrounds and operate in diverse settings within their simulation programs. Uniting all simulationists across diverse settings, education, educational philosophies, governance structures and resources is the Simulationist Code of Ethics and a cornerstone of psychological safety (Park et al., 2018). The Healthcare Simulationist Code of Ethics guides all who engage in the practice and enumerates key aspirational values of simulation: integrity, transparency, mutual respect, professionalism, accountability and results orientation (Park et al., 2018). The "Basic Assumption" developed by the Society for Medical Simulation to ensure the cornerstone of psychological safety is the belief that everyone participating in simulation – including the learners – is intelligent, capable, cares about doing their best, and wants to improve (Center for Medical Simulation, 2020). This phrase has been adopted and posted on the walls of simulation centers by educators around the world and is a

free, open access resource available to all simulationists (Center for Medical Simulation, 2020). These unifying principles are key to understanding the ethics and ethos of simulation when adapting simulation to any allied health or other profession.

When simulation was first adopted by medical and allied health educators, it was often utilized in high stakes examinations (Miller & Carr, 2016; Sibert et al., 2001; Talwalkar et al., 2020; van Zanten et al., 2007; Yousuf & Yousuf, 2019). As healthcare simulation developed and the literature became more robust, medical education integrated simulation as a component of both summative and formative evaluations. Evidence was gathered demonstrating the effectiveness of simulation in developing critical thinking and holistic competence (Goodstone et al., 2013; Kourgiantakis et al., 2019; Lee et al., 2020; Rutherford-Hemming & Jennrich, 2013; Williams & Song, 2016); clinical skills (Hayden et al., 2014; Barrow, 1993; Dinsmore et al., 2013; Herge et al., 2013; Kuhne et al., 2020; Swanson et al., 2013); communication (Kaplonyi et al., 2017; Beird & Thacker, 2017; Ditton-Phare, 2016; Donovan & Mullen, 2019; Fallowfield et al., 2003; Guiton et al., 2004; Leeper-Majors et al., 2003; Lin et al., 2013; Ryan et al., 2010); shared decision-making (Hauer et al., 2011; Theriault 2019); psychosocial skills and empathy (Gupta & Gupta, 2020; Laughey et al., 2019; Schmidt et al., 2017; Witt et al., 2018); increased learner self-efficacy, confidence, and leadership (Leigh, 2008; Sharpnack et al., 2013; Walker et al., 2015); developing interprofessional collaborations (Bridges, 2007; Cantillon et al., 2010; Defenbaugh & Chikotas, 2016; Murdoch et al., 2014; Wong et al., 2016); and many other areas (please see Table VI in the appendix). An emerging area of simulation utilization is in the area of antiracism and cultural competency training (Vora, 2020; Balzora et al., 2015; Chun,et al., 2012; Gregorczyk, & Bailit, 2008; Kanter et al., 2020; Lowe et al., 2020; Ndiwane et al., 2014; Parkhurst & Ramsey, 2006; Olzkara San, 2018 & 2020; Rutledge et al., 2004; Shah et al., 2017). As simulation has been adapted for the current COVID-19 pandemic, there is emerging evidence on the use of remote simulation as practice for telehealth utilization (Winkelmann et al., 2020; Ballman et al., 2016; Beird & Thacker, 2017; Langenau et al., 2014). This extensive literature base illustrates simulation as a versatile and rapidly evolving educational intervention.

The professional practice of simulation now extends far beyond traditional medical education of doctors and residents. Simulation has been incorporated into a number of allied health fields including nursing (Hegland, 2017; Mason Barber & Schuessler, 2018; Oh et al., 2015), nurse practitioners (Miller & Carr, 2016), psychiatry and

psychiatric nursing (Ditton-Phare et al., 2016; Piot et al., 2020, Webster, 2014)), pharmacy (Smithson et al., 2015), physical therapy (Black & Marcoux, 2002, Hayward et al., 2006; Paparella-Pitzel et al., 2009); social work (Dodds et al., 2018; Gellis & Kim, 2017), counseling (Farrell et al., 2009), dentistry (McKenzie et al., 2017), athletic training (Walker et al., 2015) and more. In keeping pace and sharing goals with these professions, the utility of formal incorporation of simulation into genetic counseling training becomes clear.

When incorporating simulation into any new field or institution, the literature offers guidance on methodologies, guidelines, best practices, and lessons learned. Prior to and while embarking on the current implementation, evidence for replacing clinical hours with simulation was examined (Fitzgerald et al., 2019; Hayden et al., 2014; Williams & Song, 2016; Fitzgerald et al., 2017), as were descriptions of guiding ethos. Nestel et al. (2018) provided insight into how humanism may serve as a guiding ethos for simulation, and this was thought to align with our graduate genetic counseling program's educational philosophy. Once alignment between simulation's guiding ethos and the graduate program's educational philosophy was determined, the simulation modality had to be selected that would best reflect this alignment. The simulation modality that best reflected humanism and the goals of our simulation program was identified as the simulated patient modality.

The modality of simulation involving simulated patients has been shaped largely by two guiding international organizations, the International Nursing Association for Clinical Simulation and Learning (INACSL) and the Association of Standardized Patient Educators (ASPE). These organizations are comprised of interdisciplinary experts representing stakeholders from all aspects of simulation. Both groups have developed Standards of Best Practice (SOBP) intended to be utilized concurrently when designing and implementing a simulation program (INACSL, 2016; Lewis et al., 2017). These are by no means the only guidelines for simulation, as the Society for Simulation in Healthcare as well as other organizations and individuals have examined simulation best practices (ASPE, 2020; Alexander et al., 2015; Beroz, 2017; NCSBN, 2016; NLN, 2015; Murdoch et al., 2014; Nestel et al., 2017; Sittner et al., 2015). The INACSL standards represent a broad scope of guidance for all simulation in medical education, whereas the ASPE standards target simulation with simulated patients in a medical training environment. Both ASPE and INACSL standards apply not just to undergraduate and graduate medical and allied health programs, but also to the training of all simulationists, and provide evidence-based criteria for designing and implementing a

simulation program. The guidance shared through these standards is particularly useful in providing a theory for how to design and implement a simulation program in a manner that is comprehensive, structured, and allows room for individualization of each simulation program, as well as lists of concrete simulation program components to consider. The INACSL standards lay out a checklist of criteria that facilitate development of a simulation program which achieves their standards: design; outcomes & objectives; facilitation; debriefing; and participant evaluation (INACSL, 2016). ASPE similarly lists six domains of best practice (with some evident analogy to INASCL): safe work environment; case development; SP training; feedback and assessment instruments; program management; and professional development (Lewis et al., 2017). ASPE further posits values which strengthen SP methodology: safety, quality, professionalism, accountability, and collaboration (Lewis et al., 2017). Both ASPE and INACSL lay out consequences that could be encountered when not adhering to these standards to frame the importance of these considerations from the very start of a simulation program. Together they represent a theoretical framework of principles and criteria that guide the envisioning of an SP program. Both groups share strong bias in favor of simulation as a beneficial methodology, and therefore highlight positive attributes and avoidance of pitfalls instead of addressing challenges of simulation and its implementation.

To delve more deeply into challenges encountered, studies were examined that focused on actual implementation processes rather than theory and design. Multiple sources offered guidance on implementing simulation programs (INACSL, 2016; Pritchard et al., 2017; Bose Ketal., 2007; Ker et al., 2005; King et al., 1994; Owens & Gliva-McConvey, 2014; Pasucci et al., 2014; Ramey et al., 2018; Rethans et al., 2012). Miller and Carr (2016) and Pritchard et al. (2017) both examine practical logistics of implementation from the perspective of experienced educators. Miller and Carr describe the utilization of SPs for teaching, learning, and evaluation in a graduate nursing education program and share practical examples about logistics, tracking, templates, and schedules (2016). While providing many helpful resources, they also give a balanced view that incorporating simulation into a curriculum can be challenging, costly, and time-consuming. Miller and Carr also emphasize a need for expert project management throughout implementation (2016). Pritchard et al. investigated how SP educators described key components of SP program design after operationalizing an SP medical educational program (2017). This study attempted to convey contemporary practices of experienced SP educators as represented in semi-

structured interviews, noting that they are under-represented stakeholders in the SP literature. Acknowledging limitations imposed by a qualitative approach, this study yields a wealth of information regarding the practical steps, pitfalls, and challenges of implementing an SP methodology. Of particular note, the Pritchard et al. study details the challenges multiple SP educators experienced when aligning simulation methodology with the educational mission and unique circumstances of their respective training programs. This was a challenge of the current study: how to adapt the theory and practical implementation guidance of experts in simulation to the particular circumstances and humanistic educational philosophy of the genetic counseling graduate training program at Sarah Lawrence College.

While we identified early on an alignment around humanism, specific aspects of simulation had to be parsed in order to decide where we as a graduate program would fall in the particular design, structure, and elements of a simulated patient encounter. Our process of building simulation in our particular context of a genetic counseling graduate program draws on the literature about comparison of simulation to other educational activities, as well as studies of specific aspects of simulation including case development, the roles and contributions of SPs, debriefing, training of simulationists, and the principle of learner-centeredness. Utilization of a simulated patient (SP) modality within an allied healthcare curriculum is supported by evidence that work with SPs can supplement existing or replace lost clinical hours (Fitzgerald et al., 2019; Hayden et al., 2014; Williams & Song, 2016; Fitzgerald et al., 2017). Hustad et al. (2019) and Lee et al. (2020) describe how simulation can be utilized as a bridge from classroom to practice, whereas Schlegel et al. (2012) examined how simulation differs from peer role plays. Mirza et al. provided guidance in case development (2020). When examining the aspect of fidelity, or the degree to which the simulation replicates the actual event (see appendix for expanded definition), Leigh (2008) and Holt et al. (2014) were particularly useful. There is ample description in the literature of who SPs are, how to work with SPs, and how SPs experience simulation (Pritchard et al., 2020; Abe et al., 2011; Newlin-Canzone et al., 2013). Multiple studies examine the value of SP feedback and learner perspectives when working with SPs (Beird & Thacker, 2017; Carter et al., 2005; Doyle Howley & Martindale, 2004; Giesbrecht et al., 2014; Gupta & Gupta, 2020; Slater et al., 2016; Maynard, 2019; McKenzie et al., 2019). Cheng et al. (2016 & 2017) shed light on debriefing, as did others (Eppich & Cheng, 2015; Eppich et al., 2016; INACSL 2016; Shinnick et al., 2011). To inform simulation training and professional development, Wallace provided valuable insight on SP training and coaching (2006), while several other

studies highlighted the unique value of immediate SP feedback and shaping SP checklists (Boulet et al., 2008; Lin et al., 2013; Leeper-Majors et al., 2003; Pfeiffer et al., 2005; Ringsted et al., 2003). We noted another group of articles focused on faculty development for simulation (Cheng et al., 2015; Cheng et al., 2016; Jefferies, 2015; Hallmark, 2015). Cheng et al. (2015) also offered invaluable thinking on how to shape a simulation experience that is learner-centered. All of these resources informed decisions about how to proceed with designing our own simulated patient program.

Before adding to the genetic counseling literature, it is useful to assess where simulation literature may be weak. Howley et al. conducted a review on the quality of standardized patient research reports in the medical education literature on behalf of ASPE (2008). Their findings suggested that there is a need for increased rigor in reporting research involving SP methodologies (Howley et al., 2008). They called for more transparency and providing adequate detail when describing SP methodologies and implementing SP programs; they expressed concern that these gaps could lead to non-replicable studies and a weakening of the literature in general. A related issue is a tendency to report on evaluation of simulation's efficacy prior to studying implementation. A number of studies were found to take this outcome-first approach, including some of the few studies of simulation in the genetic counseling literature (Erby et al., 2011; Holt et al., 2014; Becker et al., 2006; Bolstad et al., 2012; Bornais et al., 2012; Doyle Howley & Martindale, 2004; Ditton-Phare et al., 2016; Ju et al., 2014; Robinson-Smith et al., 2009; Wehbe-Janek et al., 2011). An illustrative example is Black & Marcoux's pilot study examining the feasibility of standardized patients in a physical therapist education program (2002) which provided detailed information regarding learners' perception of utility without describing their program design, how they recruited and trained their SPs, and how others could replicate their study/program. Conversely, as noted above, Pritchard et al. (2017) and Miller and Carr (2016) were transparent in descriptions of these aspects of their methodologies in a way that allows for study replication and overall strengthening of the simulation literature. Another important weakness of the simulation literature is not representing the voices and perspectives of all stakeholders, particularly privileging learner perspectives while underrepresenting facilitators and SP perspectives (Pritchard et al. 2017). The present study seeks to learn from these weaknesses by implementing simulation into a genetic counseling educational context using a transparent, practical, and inclusive study design.

While the simulation literature is limited by the aforementioned gaps in detail and perspective, it is far more comprehensive than literature on the use of simulation for genetic counseling education. Genetic counseling as a profession presents a unique set of circumstances to which simulation must be adapted, yet these circumstances are not represented in the current literature. This gap is unusual given the abundance of evidence about the benefit of simulation in training for allied health professions, a group to which genetic counseling belongs. Of the handful of articles that do examine simulation as a genetic counseling educational intervention, many share challenges noted in the simulation literature, that is, a focus on evaluating efficacy prior to documenting implementation. One such example is the study by Erby et al. in which the focus was evaluation of simulated patient consistency (2011). Documenting evidence of implementation and incorporation into a genetic counseling curriculum would lay the groundwork for researching the effectiveness and benefits of SP methodologies with genetic counseling learners as demonstrated in learners of almost every other allied health care paradigm.

Complicating the challenge of comprehensively researching and reporting on simulation is the context of the COVID-19 pandemic. Simulation has pivoted in response to the pandemic, as evidenced by the call of Park et al. (2020) for a healthcare simulationist manifesto, and the work of Dneg et al. (2020) and Brydges et al. (2020). Dneg et al. examined how to keep learners safe during the pandemic while utilizing simulation and continuing skill development (2020), while Brydges et al. laid out how their particular simulation program pivoted during the pandemic (2020). There is emerging evidence in the genetic counseling literature that the work of documenting SP methodology in genetic counseling education is beginning, precipitated by the loss of typical clinical and fieldwork experiences due to the pandemic. The January edition of the Journal of Genetic Counseling published an article by Kessler et al. attempting to characterize the utilization of simulated/standardized patients in genetic counseling graduate education prior to the pandemic (2020). Of the 25 accredited programs who completed the survey, seventeen programs reported inclusion of SP methodology in their curricula. With the standards of genetic counseling training now including simulated patient encounters as participatory cases (ACGC 2019 and 2020), the utilization of SP methodology might be expected to grow even if social distancing guidance eases to enable a return of typical in-person fieldwork and clinical experiences. Therefore, it is an opportune moment to develop guidelines of incorporating simulation into a genetic counseling educational program. The goal of the current study is to explore

specific considerations of simulation in genetic counseling while meeting the mandate of INACSL (2016), that the design of effective health care simulations facilitates consistent outcomes and strengthens the overall value of the simulation-based experience in all settings – including and especially in the field of genetic counseling.

METHODS

This study's strategy for addressing noted gaps in the genetic counseling and simulation literature was to utilize participatory action research (PAR) as a guiding philosophy and methodology. Kemmis, McTaggart and Nixon lay out the fundamental purpose in PAR as "working with others to make a shared social practice more coherent, just, rational, informed, satisfying and sustainable" (2014, p. 187). PAR focuses on research for which the purpose is to enable action (Baum et al., 2006). Often utilized in an educational setting when attempting to implement new curriculum, PAR is an iterative process of reflection, data collection, analysis, planning, and implementation that aims to improve through action (Baum et al., 2006). The methods and modes of action are formed as the research study progresses through a developing and ongoing process of action and reflection (Kidd & Kral, 2005). As a research philosophy, PAR advocates for direct lived experience to be centered in the research process – those being researched should be actively involved throughout the entire process. As a methodology, PAR is dynamic, tailored, and develops from the unique needs, challenges, and learning experiences of a specific group in particular circumstances (Kidd & Kral, 2005).

Implementing PAR in the particular circumstances of the current study required analysis of the broad scope of multidisciplinary utilization of PAR in health research and education literature. PAR is rooted in education research traditions (Kemmis, 2006; von Pressentin, Waggie & Conradie, 2016; Wallerstein et al, 2017; Stringer, 2008) as well as the social sciences (Cassell & Johnson, 2006). Badham & Sense (2006), MacDonald (2012), Janes (2016), Edwards (2018), and Felner (2020) frame considerations, benefits, challenges, epistemic power, and privilege in PAR methodology. PAR has well documented applications in health care literature (Baum, 2016; Borbet, Francis & Chapman, 2007; Espenschied et al., 2012; Reed, 2005). Van den Steene, Van West and Glazemakers lay out the potential of PAR within the mental health field (2019), and Danley & Ellison provide a useful handbook for utilizing PAR methodology for projects in this context (1999). After reviewing PAR across multidisciplinary fields, the

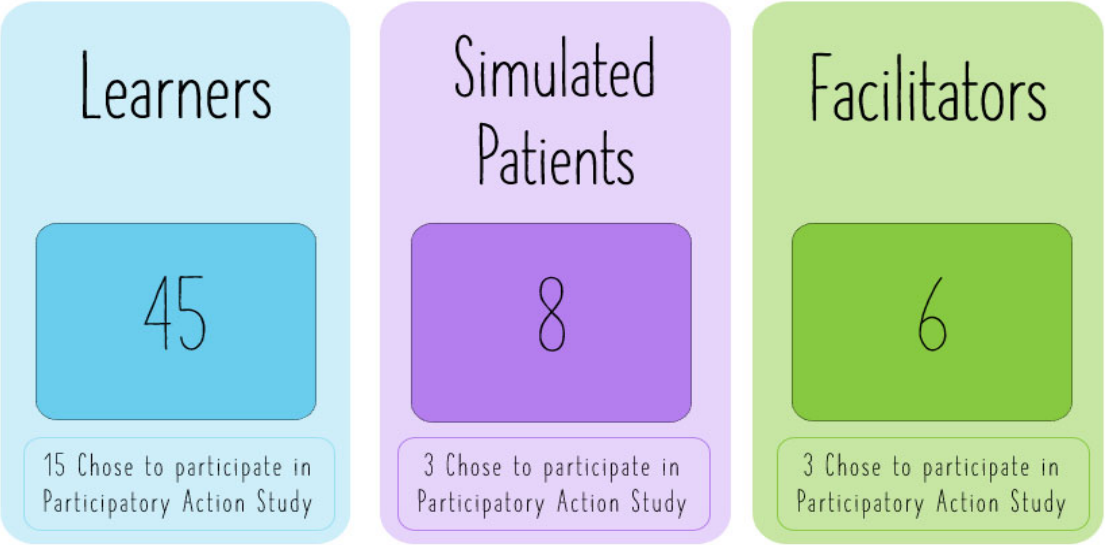
researchers embarked on identifying the particular strategies, tools, and ethos this method would require in the current study.

PAR requires researchers to take on a commitment to democratization of both content and method, being willing to question and challenge established methodological tenets (Kidd & Kral, 2005). The roles of the researcher in a typical study design is critically examined and reconstructed in PAR, and the researcher's preconceptions regarding goals, means, methods and actions must be amenable to change as the action unfolds (Kidd & Kral, 2005). This methodology has the potential to be viewed by the participants as contributing to a sense of self-awareness, empowerment, self-confidence, and hope for the future (Baum et al., 2006). Based on all of these considerations, the researchers decided that utilizing the methodology and ethos of PAR – a process of inquiry that is inclusive of all stakeholders and provides transparency in the implementation, challenges, and adaptations utilized when designing a new program – would best support the study of integrating simulation into genetic counseling education.

Participants

This research study was submitted to the Sarah Lawrence College Institutional Review Board (#00009775) and was determined to be exempt from IRB review, falling under the category of classroom research. Eligible participants were identified as anyone involved in the implementation of simulation in the Human Genetics Program at Sarah Lawrence College, including program leadership, faculty, facilitators, simulated patient actors, and learners. A total of forty-five students (five learners from the Class of 2020 in the pilot, fourteen learners from the Class of 2021 during

Table I: Participants



the summer, and twenty-six learners from the Class of 2022 in the spring semester of their first year) participated in a total of two hundred and seventy simulated sessions over the course of thirteen months. Eight professionally trained simulated patients and six facilitators constituted the simulation team. All learners, simulated patients, and facilitators were invited to be a part of the participatory action research study of simulation implementation. Twenty-one people also chose to participate in PAR study (see Table I): three facilitators, three simulated patient actors, and fifteen learners.

Instrumentation

In PAR, the researched help plan, implement, and evaluate their activities with support of the research team facilitating an iterative process of reflection and action (Baum et al., 2006). Kemmis, McTaggart and Nixon describe data collection within the context of PAR as a rolling and dialectical relationship that exists between the analysis of evidence gathered and the new kinds of questions – requiring new kinds of evidence – generated through the ongoing process of reflection, analysis, and action required by PAR researchers (2014). Methods for gathering evidence include journals, reflections, logs, field notes, structured and unstructured interviews, interviews to the double (Niolini, 2009), audio and video recordings, document analysis, interaction schedules and checklists, student work samples and assessments, needs assessments, debriefings, and focus groups as determined necessary throughout each step of the process. Individuals were interviewed from each role group to capture their experience.

Procedures

The research team conducted multiple cycles of reflection, analysis, and action between March 2020 and April 2021. Implementation cycles were constructed of the following stages: an initial planning/pilot stage in the spring semester of 2020 (involving one simulated patient, one facilitator, and five learners); two rounds of replacement fieldwork during the summer of 2020 (involving four simulated patients, five facilitators and eight learners in July, and four simulated patients, six facilitators and seven learners in August); a second planning and envisioning stage during the fall and winter of 2020; and incorporation into the first year curriculum in the spring semester of 2021 (involving seven simulated patients, five facilitators, and 26 learners). As ongoing reflection and analysis determined the procedures, the exact procedural and analysis details will be discussed in the next section.

Data Analysis

The researcher gathered evidence of the participants' experiences through sustained engagement ensuring a continuous, consistent, dependable collection of data throughout the entirety of the study from March 2020 through April 2021. Inductive qualitative content analysis was applied to the data sets, with emphasis on building thick description and triangulation. Content analysis of all text involved: (1) multiple readings of all texts to build deep familiarity with the entirety of the data set; (2) identifying and describing significant decisions, actions, and reflections; (3) organizing decisions, actions, and reflections into categories; (4) interrogating categories to arrive at synthesized themes; and (5) returning to the data to ensure themes mapped back to triangulated data points. An illustration of the overview of the implementation was developed, mapping cycles of reflection, analysis, envisioning, and action (Figure 1). Figures and illustrations were created to track the evolution of roles and the development of the program over the course of the year (Table 2, Table 4, and Illustrations). Significant decisions and actions are tracked and synthesized (Table 3). Participant quotes are in italics and attributed to role groups ("L#" for learner, "SP#" for simulated patient, and "F#" for facilitator) and data source ("D" for debrief, "I" for interview, and "R" for weekly written reflection). Analysis resulted in identification of the following themes: Co-Creation within the Team - Building as We Go; A Formative Holding Environment that is Learner-Centered; Workshopping - Maximizing Unique Aspects of Simulation; and Pushing Towards the Growing Edge while Bridging Theory to Practice.

RESULTS

A participatory action research approach was utilized in which an iterative cycle of planning, action and reflection informed real-time implementation. A pilot project was completed in the spring 2020 semester which developed into two four-week summer simulation rotations and culminated in all first-year students completing a three-week simulation experience as part of their Introductory Fieldwork requirement in spring 2021 (see Figure 1).

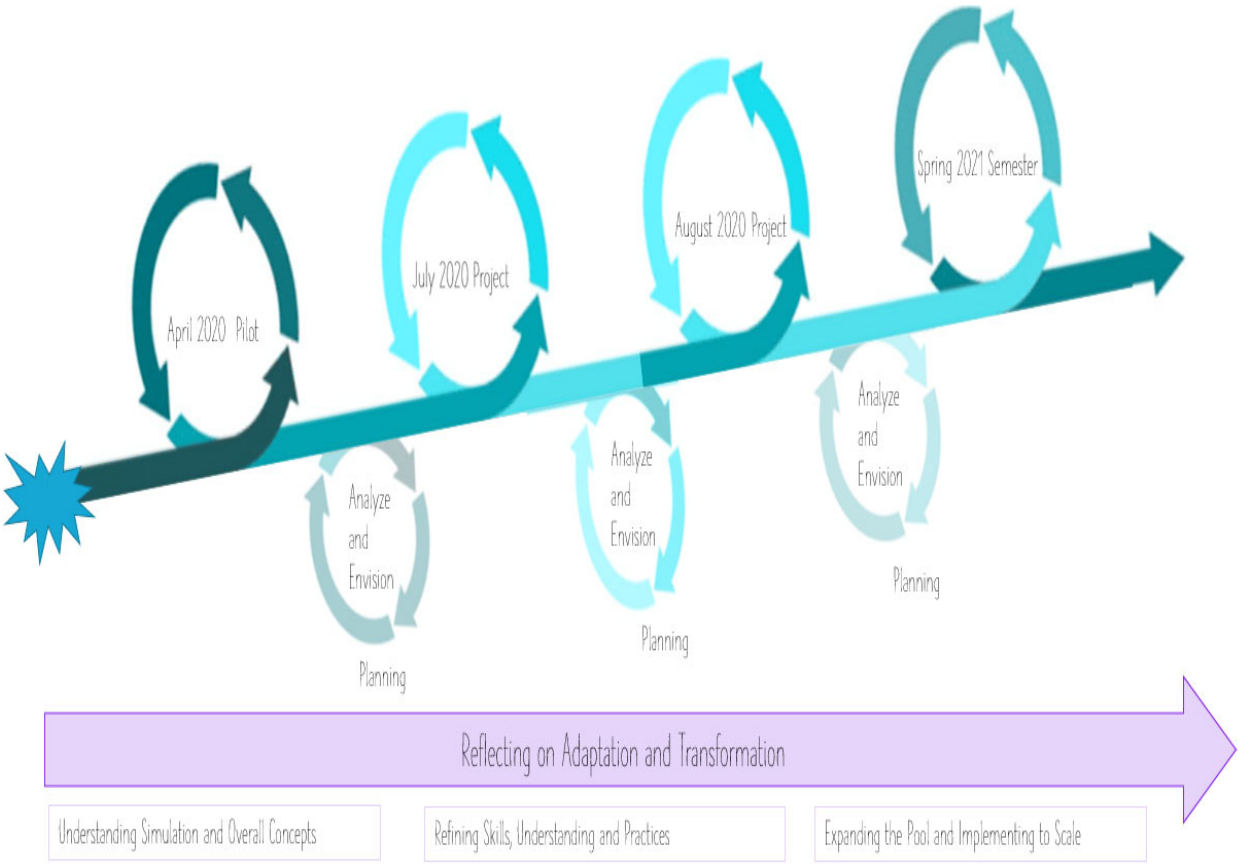


Figure 1: Overview of Simulation Program Development and the Iterative Cycles of Implementation. A total of 270 simulation sessions were completed over the course of the study.

Defining Participant Roles

The need to differentiate participants, delineate roles, and define participation preceded creating a needs assessment as the first planning step of implementation. A group of key stakeholders was identified with representation of learners, simulated patients, facilitators, and program leadership. The key stakeholders collaborated as change agents – creating needs assessments, planning, implementing, and synthesizing PAR methodology throughout the entire study. The key stakeholders differentiated five main roles within the simulation program (see Table II): learners, simulated patients (SPs), facilitators, project management, and program leadership.

Table II: Participant Roles

Learners (45)	* Prepare learning goals * Pre-brief with facilitator prior to session to discuss learning goals, case preparation and plan for session approach * Act as the genetic counselor within a session of simulation * Debrief with SP and facilitator * Reflect and synthesize feedback to set new learning goals for next session	
Simulated Patients (8)	* Learn scenario * Train scenario and develop patient character * Act as patient within a session of simulation * Debrief with learner and facilitator * Give written checklist/ feedback to learner * Debrief with team at team meetings and with project management as needed	
Facilitators (6)	* Train on debriefing and review scenario * Pre-brief with learner * Act as guide on the side within a session of simulation * Debrief with learner and SP * Give written feedback to learner * Debrief with team at team meetings and with project management as needed	
Project Management (2)	* Operationalize and oversee planning and implementation * Assess and tailor case development * Logistics and technology * Scheduling * Run team meetings * Triage and troubleshoot * Professional development of team as simulation educators	
Program Leadership (2)	* Envisioning and shaping how simulation will fit into overall genetic counseling program * Budgeting and allocation of resources * Hiring and personnel oversite * Case and learning objective development	
Lead SP (1)	* Welcome new SPs to the program * Meet with all SPs prior to starting a new case to review and answer questions * Attend all training sessions for new cases/new SPs * Serve as SP resource, advocate, and point person * Work closely with project management and program leadership	
Key Stakeholders (4)	* Group of four who convene to strategize, synthesize and envision simulation * Represent all roles and responsible for feeding reflections, adaptations and core decisions made back to the team * Responsible for oversight of entire simulation process * Responsible for oversight of PAR processes	

Attempts were made to disambiguate roles to clarify responsibilities respective to each role; however, limited personnel, resources, and time meant a single person might have multiple, overlapping roles. In the midst of the study, a sixth role – lead SP – was added.

Program Design and Adaptations

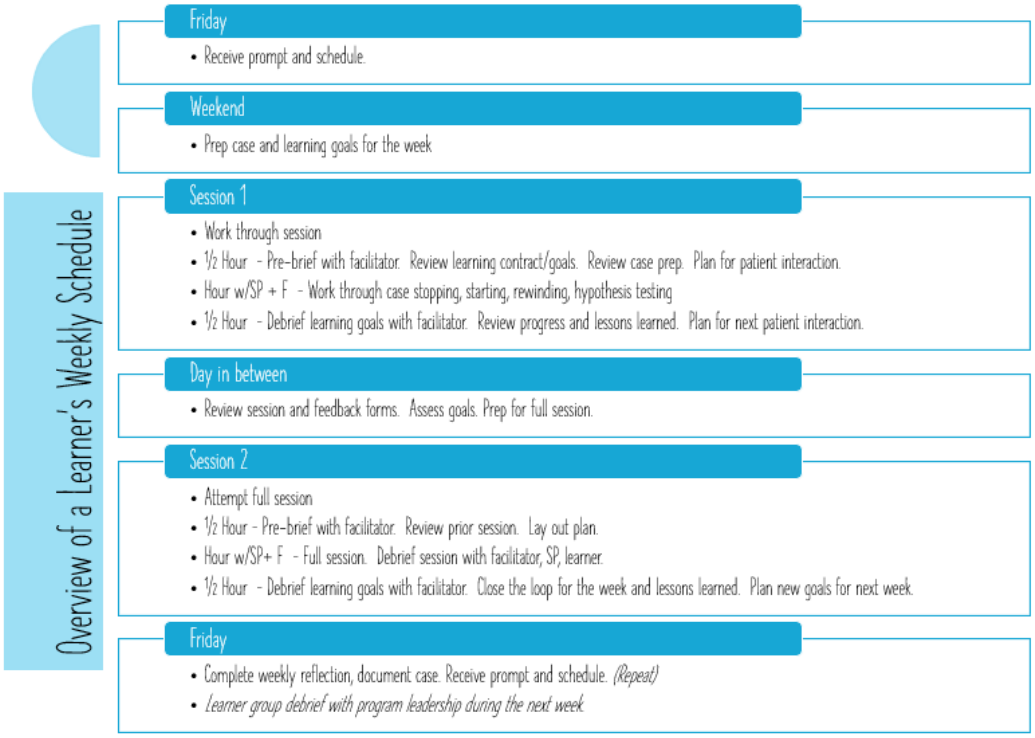
Each iteration of simulation incorporated needs assessment, planning, action, reflection, evaluation, and modification that enabled continual adaptation informed by feedback from all participants. Key adaptations are noted in Table III. Structural design for each session was identified as being critical throughout every cycle of the implementation. Each case was based on a two-session working model (see Table IV): the learner receives the case prompt the week prior to the sessions to allow time for case preparation, then conducts two encounter sessions of the same case within a

Table III: Summary of Key Adaptations Made During Implementation Through Iterative Cycle of Reflection, Analysis, and

Pilot	Summer 1	Summer 2	Spring Semester
• 5 Learners • 1 SP • 1 Facilitator	• 8 Learners • 4 SPs • 5 Facilitators	• 6 Learners • 4 SPs • 4 Facilitators	• 26 Learners • 6 SPs • 5 Facilitators
• Goals: establish working relationships (SPs, Facilitators, Learners, and Project Management).	• Goals: implement a series of simulation sessions to replace lost clinical experience.	• Goals: refine approach based on experiences in Summer 1 by feeding adaptations and improvements into the program with new learners.	• Goals: embed simulation in the Introductory Fieldwork experience of all first year students as a requirement of the graduate program, with each learner conducting a prenatal, cancer, and pediatric case.
• Cases: abnormal ultrasound findings, autism, family history of muscular dystrophy, family history of known *BRCA* variant, prenatal diagnosis of Down syndrome, recent personal diagnosis of triple negative breast cancer, and return of results.	• Cases: family history of known *BRCA* variant, advanced maternal age, autism, Long QT, and Huntington Disease; extended cases by adding one return of results session.	• Cases: same as Summer 1 wtih addition of anencephaly; optional return of results session	• Cases: family history of known *BRCA* variant, family history of known *PALB2* variant, advanced maternal age, autism, Long QT, tetralogy of fallot
• Adaptations: created trainings in working with simulated patients, learners, facilitators, how to prebrief, debrief, and how to set up sessions via a remote service delivery model; established project management role and graduate assistant role; recruited team; conducted planning for summer cycle.	• Adaptations: established process by which each learner works through a session with a facilitator and an SP by stopping, starting, and experimenting with elements of the session to meet their own self-determined goals; repeats the scenario later in the week attempting to run the entire encounter from start to finish; learner logs case; both sessions recorded via Zoom for learner review; created learner, simulated patient, and facilitator orientations; implemented weekly team meetings.	• Adaptations: included facilitators in weekly SP meeting to form full team meeting; optional final review/debrief with facilitator of the learner's choosing; adapted learner orientation/ prebrief to scaffold idea of stopping, starting, and experimenting with personal counseling style; shortened prebrief with facilitators and extended debrief with SPs.	• Adaptations: added self-directed learning workshop based on learner feedback of wanting more scaffolding for how to approach learner-centered educational intervention; added facilitator debriefing workshop; eliminated return of results; added weekly debrief for learners and program leadership; added a group prebrief for learners prior to first case; recruited, hired, and trained 3 additional SPs; added lead SP role.
• Total sessions: 6	• Total Sessions: 64	• Total Sessions: 44	• Total Sessions: 156

single week. Each session begins with a pre-brief when the learner reviews their learning goals, case preparation, and thoughts about the case with their facilitator; the encounter begins when the SP joins the session and works through the case with the learner; the learner, facilitator, and SP debrief the encounter as a group; after the SP leaves the session, the session concludes with the facilitator and learner assessing the learner's performance with respect to the learner's goals and planning adaptations for future sessions.

Table IV: Overview of a Typical Learner Week during



Through successive adaptations throughout the year, simulation progressed and expanded to meet the needs of multiple participants. Key to its development was starting with a small pilot project through which the key stakeholders defined the team model, working ethos, and structural foundation of the simulation program. These key stakeholders were involved in shaping the simulation program throughout the entire year; as they oversaw its development and progress, adaptations and lessons learned were readily identified and tracked.

Debriefing was built into every iteration of the simulation program implementation. Learners debrief after each session with the SP and facilitator, complete a weekly written reflection as a self-debrief, and routinely debrief with program leadership. The simulationist team debriefs at weekly meetings. At the end of each iteration cycle, learners, facilitators, SPs, and program leadership meet for separate group debriefs to process the experience from the perspective of each role.

Development of the Program Simulation Model

The simulation program went through a series of iterations illustrative of cycles of reflection and action of PAR. The initial pilot, comprised of a small group representing faculty, program leadership, simulated patient, and learner perspectives, first met to explore whether simulation within the genetic counseling program was feasible and what

unique benefits it could offer to learners. The primary aim of the pilot was to explore the structure of a single session and support individual learners in need of additional skills practice following reduced clinic time due to the COVID-19 pandemic. The next two iterations focused on a series of sessions for a proportion of learners in a cohort in the summer of 2020. It was at this time that we aimed to build a simulation team and do a deep dive into how a series of simulation sessions might come together to reimagine a genetic counseling rotation equivalent to standard clinical placements. The fourth iteration systematized the simulation experience as a 3-case series for every first-year student as a core component of their Introductory Fieldwork requirement in the spring 2021 semester. The aim of this iteration was to incorporate a self-directed, learner-centered simulation rotation as a formative bridge from theory to practice and prepare learners for summer clinical fieldwork.

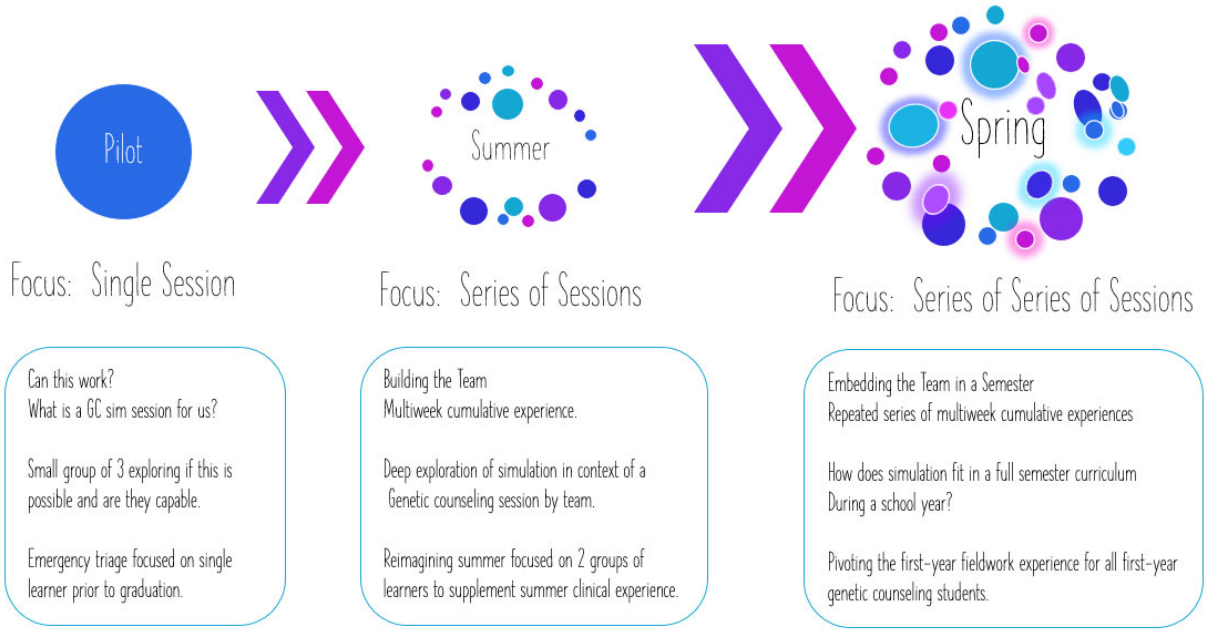


Figure 2. The Development of the Simulation Program: Focus and Aims

Through an iterative process of envisioning, planning, operationalizing, activating, and reflecting, the program was able to build on each iteration to develop and hone its vision, team, design, and implementation of simulation within the curriculum, allowing for the simulation program to serve as a unique reflection of the educational philosophy of the genetic counseling program and ethos of the educators involved. By analyzing these iterations, a working model of the process of development was identified (see Figure 3).

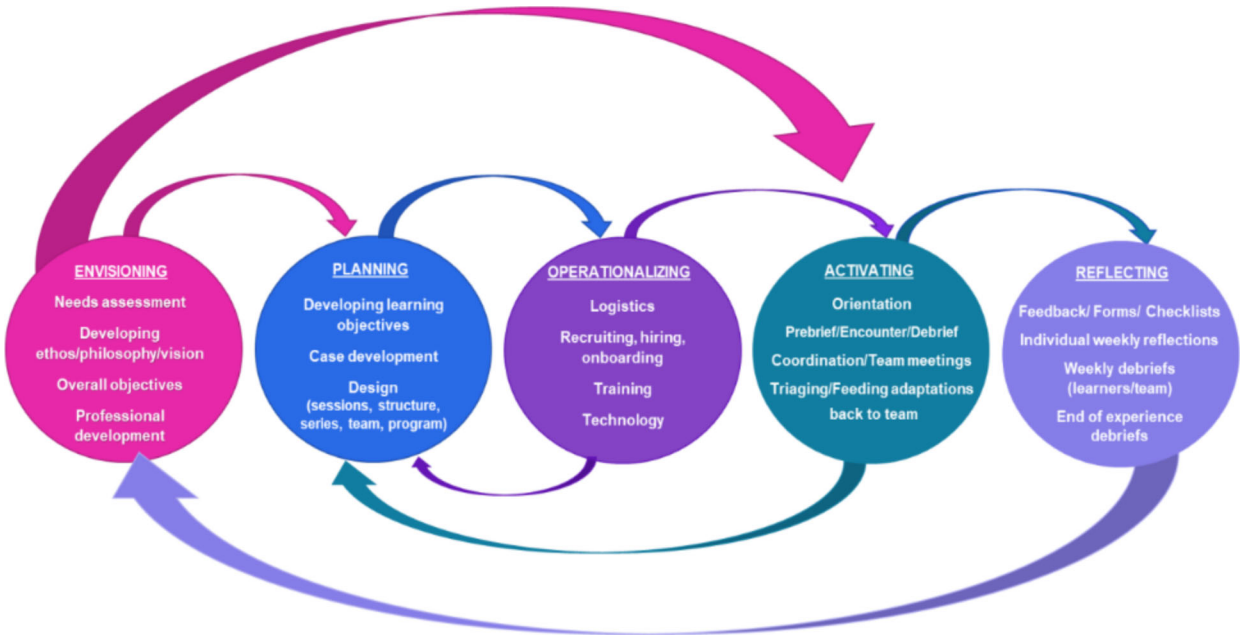


Figure 3. A Working Model of the Development of the Simulation Program

The working model was enacted for each iteration noted in Figure I, but also served as a framework to move between iterations, allowing further development to hone the simulation program throughout the course of the year.

Themes: Key Guiding Influences and Decisions

Participatory action research is gestalt in nature and incorporates tools from qualitative, quantitative and mixed methods research methodologies in analyzing outcomes. After analyzing the implementation of the simulation program utilizing PAR over the course of a year, a secondary analysis of all data sources (debriefs, reflections, and stakeholder meeting notes) was conducted. The following themes were identified by moving deeper into an inductive qualitative analysis: Co-Creation within the Team - Building as We Go; A Formative Holding Environment that is Learner-Centered; Workshopping - Maximizing Unique Aspects of Simulation; and Pushing Towards the Growing Edge while Bridging Theory to Practice.

Theme: Co-Creation within the Team - Building as We Go

This simulation program was identified from the inception as a co-creation by interprofessional educators and simulationists. Involving simulated patients in every aspect of program design, implementation, and management was imperative to this vision and required that the simulated patient perspective be integrated from the beginning

when honing the overall vision and ethos of the program, as well as throughout the development of cases, session design, feedback guides, debriefing, and program management checklists. This decision to include simulated patients as co-creators was realized through the assembling of an interdisciplinary team of key stakeholders who shaped every aspect of the simulation program; a small group of three representing all roles (simulated patients, faculty, program leaderships, learners and researchers - with some roles overlapping in the same individual) came together to imagine what a simulation program could look like at Sarah Lawrence College and co-created a vision where all voices on the team were equal.

The simulation program would also be shaped by the ongoing developments of the COVID-19 pandemic. Key stakeholders consciously and continuously committed not just to iterative cycles of reflection and action characteristic of PAR methodology, but also to an overarching mentality of flexible adaptivity due to the changing nature of the pandemic. The pandemic also accelerated the developmental process and increased pressure to explore simulation. What emerged was an understanding of "building as you go": this implementation was not unfolding in ideal circumstances, but contextual uncertainty and ambiguity presented the opportunity to experiment, innovate, and be agile to change. Participants expressed how challenging it was to maintain this mindset. However, these circumstances came to reveal grit and perseverance that aligned well with the philosophical ethos of our genetic counseling program. The development of simulation also reflected the principles of humanism and a willingness to be agile in the pursuit of innovation upheld by our genetic counseling graduate program. Extending the graduate program's commitment to humanism and innovation to every role within the simulation program guided all future steps. These values also offered a scaffold when coping with the pervasive sense of chaos from the pandemic. With little time for a typical decision-making process, we reminded ourselves of the larger values of the graduate program and could center them when making decisions in the shifting chaos of the developing pandemic. These values of grit, perseverance, humanism, and innovation were central guiding influences that reacted synergistically with pressures created by the pandemic to enable the simulation program to develop at a rate that may not have been possible in different circumstances.

A willingness to be adaptively flexible extended not just to those implementing the program but also to the learners experiencing simulation. The ethos of experimentation was highlighted in how sessions were designed, how

the learners were oriented to simulation, how faculty and SPs were trained, how debriefing was shaped, and how learners directed their sessions for their learning. Each participant knew their voice would be valued when sharing what they learned, how they were working out challenges, what adaptations were made, what was still needed, and how we might meet those challenges together. Learners modeled hypothesis-testing within their sessions, exploring, risk-taking, and workshopping their sessions as they moved through their simulation experiences. All roles participated in a co-generative dialogue to develop their role, their own voice, and their own style of implementing simulation within program.

> *It has been such a crazy time since March with the pandemic. I know how much work it was. But to create this together with all of you. It was really meaningful to do this together for our students. It needed to be done and everyone stepped up. And our students are learning things. We've acquired new colleagues in the SPs, that we hope to continue that relationship with. It makes me emotional, because we could not have provided any clinical training in the current situation. (F3, D)*
>
> *It was also due to a willingness to jump in and say – yes, let's try this. We are in this situation, but let's jump in, try this and figure it out as we go. Being willing to put the resources into it. Being willing to adapt as we went and figure it out together. And doing it all in such a short amount of time. (SP2, D)*
>
> *I felt completely like I had a say in how changes were made, my voice was both welcomed and heard, and I was an integral part of this creation process. (SP1, I)*
>
> *Debriefing with the team, being able to talk about what we are learning as facilitators, what we are learning with the SPs, and what we are learning about sim helped define the role of the facilitator as we went. (F1, D)*

Adapting as we went, the simulation team embraced all voices as equal co-creators learning to define their roles while building and developing the simulation program based on shared values, responding with innovation and speed as we came together for our learners during the pressures of the pandemic.

Theme: A Formative Holding Environment that is Learner-Centered

Constant efforts to operationalize a learner-centered focus were identified as a theme throughout program development. The concept of "learner-centeredness" was discussed, debated, and processed throughout the year. Each iteration saw an attempt to refine the concept and make adaptations to meet our evolving definition of what learner-centered simulation would mean to our simulation program. In each learner, facilitator, SP and key stakeholder debrief, the concept was evaluated and our experiences and approach were analyzed to see if aspects of the design, facilitation, feedback, and debriefing were aligned with a learner-centered philosophy. Every participant struggled to define what this concept meant both to their role and to overall the simulation program.

Learners identified wanting a better introduction to the possibilities presented in a learner-centered simulation experience; therefore, a self-directed learning workshop was developed and incorporated into learner orientation prior to the start of the fourth iteration. Facilitators wrestled with defining the role of facilitator within the context of learner-focused simulation. A debriefing workshop that centered the idea of learner-focused debriefing was developed and implemented. Psychological safety and reducing learner anxiety were centered, and emphasis was placed on collaboration in a low-stakes, learner-centered holding environment. With these workshops, the idea was identified that intentional scaffolding of the concept of learner-centeredness for both learners and facilitators would be a helpful adaptation in future iterations.

Co-creating this learner-centered environment prompted the decision to build simulation as a formative educational experience with emphasis on experimentation to encourage expression of each learner's style. The idea of creating a formative holding environment was directly tied to upholding a learner-centered focus. Learner self-efficacy and exploring personal counseling style emerged as explicit objectives for simulation. To accomplish this, a purposeful affirmation of simulation – rather than standardization – was made. Simulation allows the educational team to meet a learner where they are and tailor a session to each individual's preferences – which learning goals they identified, how they wanted to utilize the tools of simulation, and assess where they are on the path of their development as a genetic counselor. A standardized approach was viewed as not allowing the learner to be self-directed, as the SP and facilitator take a standardized approach to each session in order to evaluate learner performance and compare it with others. As our primary objectives were to develop self-efficacy and explore individual counseling styles, we purposefully embraced simulation and integrated it in every level of the learner experience. Learners could choose to target certain aspects of a session and/or request specific kinds of feedback, guidance, brainstorming, rewinding, and replaying. Simulation and a learner-centered ethos potentiates learner self-directedness and allows the team to personalize the experience such that no two sessions are the same.

> *The learning was certainly centered on the learner. That was liberating for me as an SP because I always knew that my objective was meeting the learner where they were and helping provide them with the tools to move forward. It wasn't about being a perfect, standardized patient, it was about helping fill a learner's toolbox. (SP1, I)*

> *The case was extremely interesting, and the SP played a dynamic character which both complimented my strengths and challenged my weaknesses. Valuable feedback and suggestions were provided by both the SP and my facilitator. I appreciated multiple opportunities to debrief. (L10, R)*

> *I loved being able to workshop the components of the session that I needed to-shoutout to the SP for being able to jump in and out of character to provide me with a fantastic practice experience and great feedback. I noticed a great shift in my overall confidence going into [the second] session, which I have not experienced in any previous prenatal session I've participated in. From the feedback I got from the SP, she picked up on it as well, which contributed to a more comfortable, conversational counseling session. My facilitator was such a great facilitator across both days, providing me with insightful suggestions and helping me work through my roadblocks. (L5, R)*

> *For me I focused on the skills as a facilitator. The learner was responsible for the content. It changed the relationship, as I approached it like a blank slate. It changed the partnership with the learner. They would have something to tell me. And I would have something to tell them. It helped me to meet them on common ground. (F2, D)*

> *I think as facilitators we can be in the moment and listen to the students more – focusing solely on them, as opposed to needing to worry about our patients and the students. You can take away a lot of those distractions and really be learner-centered. (F1, D)*

Focusing on the learner in a low-stakes, formative environment allowed the simulation team to partner with learners to strengthen their sense of self-direction, develop their voice, empower their strengths, challenge their weaknesses, help them work through roadblocks, and meet them on the common ground of learner-centered simulation.

Theme: Workshopping - Maximizing Unique Aspects of Simulation

Another emerging theme was selecting ways to maximize the unique educational aspects of simulation, asking "What could learners experience only in patient simulation?" Strengths of simulation emerged as immediate experimentation with multipronged feedback, repetition and reinforcement via workshopping to build skills, feedback, cultivating relationships, and bridging theory to practice. The team repeatedly refined cases, restructured sessions, and clarified options for maximizing simulation's strengths. Framing simulation as a workshop for in-the-moment hypothesis-testing and experimentation during learner orientation and prebriefing described to learners the potential to experiment and build skills through simulation.

> *This simulation experience was very effective and valuable for me. I liked being able to take risks and try new cases that I was unfamiliar with. (L6, R)*

> *I was very nervous for the first session, but once I got into it, I began to realize how truly helpful it was to be able to practice, pause and start over in a low-stakes environment. This helped me to greatly improve during the second session and reinforce the skills I wanted to build. (L3, R)*

> *I learned that I really benefit from having the opportunity to workshop. Prior to this experience, I haven't felt like I had the opportunity to start and stop a session, but that I had to run it from beginning to end. During this week's simulation, I really took advantage of the hour… to run the part over and over…that I was the most nervous about, which helped to improve my confidence exponentially for the full session. (L5, R)*

> *For the first session I was pretty nervous. I also felt that I was focused more on just getting the information that was in my head out than tailoring the session to the patient. Being able to break the session up and stopping for feedback after each part was very helpful. (L8, R)*

Patient and facilitator feedback were highlighted as unique aspects of simulation, as was the chance to try out a different order of session components, a particular counseling style, or an educational resource - then ask for targeted feedback in real time. Immediate patient feedback was identified as an especially valuable aspect of workshopping an idea or skill; having the opportunity to try out a new approach, hearing immediate reactions from the simulated patient, brainstorming with the simulated patient and facilitator on improvements and alternatives, then immediately trying again was viewed as a powerful learning process. Additionally, learners could conduct self-assessments, offering themselves feedback, by reviewing recordings of each session.

> *The feedback during simulation was extremely helpful. Both from the SP who gave an amazing patient perspective and from my facilitator. The feedback was constructive, and I really felt like it allowed me to make beneficial, necessary changes. (L13, R)*

> *I feel I do my best learning when I try something first and then receive specific feedback and then work to implement it. Watching the recordings from the first and second session this week I saw a huge difference that resulted in a much more successful patient encounter in the second session. (L8, R)*

Workshopping and exchanging feedback forged strong working relationships among learners and SPs, learners and facilitators, and facilitators and simulated patients. Adaptations were made to encourage facilitators and SPs to communicate via zoom chat private messages to hone patient responses and facilitation approaches to strengthen the learner-focused, tailored educational approach that could take place only in simulation and only in a learner-centered environment.

> *The facilitator and I have started to communicate via the chat function during the session. We can really tailor the session to offer just enough challenge to the learner in the moment to keep them growing. It has been fun to work together in this way. (SP2, D)*

> *I just feel like this is such an enriched learning process that sets up on so many layers of how the learning can take all this different feedback – to try, to experiment, to expand their skills. It was just really lovely to be involved. (F1, D)*

Multiple participants remarked on the increased learning velocity accomplished in a week of simulation sessions. What might take weeks in clinic – due to scheduling and waiting for another patient with a similar reason for referral, demographics, or psychosocial concern – could be explored, practiced, and reinforced in a single week of simulation.

> *I do want to say that from the first case, and this just got reinforced each time, the learning velocity that I witnessed with students and how they were able to adapt, tailor, shape new skills, really try things and put them into practice…I feel like I saw things that would take us six weeks in a traditional clinical rotation because you couldn't control for being able to see a similar case or a patient that responded in a similar way. The density of the one-on-one time to really sit with them and deeply pre and debrief. I was really amazed at some of the leaps and bounds I saw learners making. (F1, D)*

> *I didn't expect to see such a dramatic improvement between the two sessions. But being able to really focus on one case for three days ended up being incredibly beneficial. (L1, R)*

The team repeatedly highlighted a number of unique aspects of simulation as compared to features of clinical training. Simulation was viewed as a bridge from classroom to clinic or theory to practice. Learners and facilitators remarked that they appreciated the chance to hone concepts in a low-stakes environment with an emphasis on experimenting with ideas learned in a classroom before they would try them with actual patients in a clinic. Simulation as a bridge from theory to practice became a key guiding concept moving into future iterations of simulation within our program.

> *Once I slipped into the "role" so to speak, it felt straightforward to get feedback and apply it to the session in real time. I am very thankful for this opportunity to try out new tactics in a session without feeling embarrassed. Retrospectively, I think it really felt like the actor was a true patient. I didn't know her just as much as I wouldn't know a patient and I found that my mindset moved in-between practice and real session. (L12, R)*

> *I definitely think this week's simulation was effective. As previously mentioned, it was my first sense of a "real" patient experience, which has been the component of my training that I've been missing. Really helped to tie everything I've learned together and I'm excited to continue to practice these next 3 weeks! (L5, R)*

Maximizing the unique strengths of simulation through workshopping, trying out new tactics and tying together the density of feedback in the prebriefs and debrief sessions allowed learners, facilitators and SPs to adapt, tailor and develop new skills while bridging theory to practice in their simulation sessions.

Theme: Pushing towards the Growing Edge while Bridging Theory to Practice

Once we identified that simulation provided learners with a supportive learning environment that enabled them to practice at the present limits of their competence, the question became how much do we apply simulation to

push learners to their growing edge, to expand the scope of their competence overall? In the formative holding environment that we established with a learner-centered focus, the team debated how to titrate supportive and challenging feedback to encourage learners to linger at their growing edge. These discussions similarly raised the question of how much do we push ourselves as new simulation educators to the growing edge in order to develop as simulationists? Starting this program not only offered a formative holding environment for graduate learners on the path of training for genetic counseling, but also for the faculty, program leadership, and simulated patients to progress on their paths of training in the practice of simulation.

Wrestling with exactly how we push our learners and ourselves to the growing edge while creating a simulation program during a global pandemic was constantly at play over the course of the year. At times simulated patients and facilitators would discuss how they identify a growing edge within a learner and how they shape their sessions to meet the learner at that growing edge. Learners also described how simulation acquainted them with their own growing edges.

> *In the first few minutes of the session I am assessing where the learner is. Then I adjust to push them just enough until I feel resistance. I adjust my response, my questioning, and my reactions to push them just to the edge of their resistance. Never too far, but just to the edge. (SP3, D)*
>
> *My debrief with my facilitator on Friday after my simulated patient session (and all of my debriefs/prebriefs with this facilitator) was the most helpful and affirming for me this week. She really helped me build my confidence in my counseling skills and feel comfortable in the genetic counselor position. Also, she helped provoke me to think about different routes my counseling sessions could've taken which I think will be extremely helpful as I move into these next few weeks/rest of my training. (L15, R)*
>
> *On Tuesday, my SP presented as an open-minded patient in a good mood and ready to learn. On Friday I asked for a challenge, so my SP presented as someone who had a busy day, didn't trust the medical system very much, and felt offended that she'd been referred for her age. Even though I found this character challenging to work with…I found that choice from my SP most helpful as I develop my skills beyond just knowing how to run a session. I now can learn how to adjust my counseling to assist patients who may not feel as open to learning or sharing personal information with me. (L11, R)*
>
> *Both my facilitator and SP mentioned that I have the right instincts on what to say, but I think I talked myself out of a lot of opportunities to engage with the patient that held me back in the session. So this week I learned that I should move more towards what feels uncomfortable because that's where change happens. (L7, R)*

At other moments, key stakeholders would discuss the importance for facilitator and SP development and training to move closer as a team to our collective growing edge.

> *[Simulation] required, like it sent me back along my curve of self-confidence, in terms of new skills. Let me figure out what a facilitator is. And it was kind of fun to be in that learning-mindset again just for myself as I took on a new role. Figuring it out as we went. (F1, D)*

> *Being able to feel out where a learner is in their journey and push the scenario to make them grow in their experiences was very successful in my opinion. It is a difficult thing to describe as it is borne out of experience and empathy and learning how to manipulate a session to give what is needed. I do feel like I learned a great deal during this process about myself and have a better understanding of myself as an SP. (SP1, I)*

While learners were making strides bridging theory to practice within genetic counseling education, the simulation team was bridging theory to practice within simulation education. Learners, faculty, simulated patients, and program leadership all strove in different ways and through their respective roles to push themselves to the growing edge over the course of the year in order to bridge theory to practice. The location of that edge was perpetually contested, as no standardized definition was sought. However, pushing to the growing edge was a guiding aspiration in each iteration of the implementation, also reflecting our values and the ideas we centered as a simulation team. Pushing to the growing edge allowed us to find the synergies of co-creation – pushing us to further embody perseverance, humanism, grit, and innovation. A manifestation of this guiding aspiration for future iterations is to see how as a simulation program we can push to our growing edge within the genetic counseling graduate program at large. How can we innovate, adapt, and pivot to push towards a growing edge as simulationists moving forward with simulation within the two-year curriculum of the Human Genetics Program?

DISCUSSION

By conducting an action research study of the integration of simulation within our genetic counseling graduate program, we aimed to capture and report a transparent implementation of a simulation program, examine adherence to simulation standards and contribute to an emerging body of literature on simulation in genetic counseling education. By discussing the lessons we learned, our alignment of values, our limitations and our suggestions for future research, we hope to answer the call to action of Park et al. to come together as healthcare simulationists within genetic counseling to examine how we implement and tailor simulation to meet the unique context of genetic counseling training (2020).

Actualizing Participatory Action Research

Discussions of participatory action research studies must begin with an examination of how successful the research team was in utilizing the PAR philosophical framework. Dickens and Watkins (1999) suggest asking the following questions when discussing PAR:

> Was it reflexive and dialectical? Was it ethical, democratic, and collaborative? Did participants learn new research skills, attain greater self-understanding, or achieve greater self-determination? Did it solve significant practice problems or did it contribute to our knowledge about what will not solve these problems? Were problems solved in a manner that enhanced the overall learning capacity of the individuals or the system? (p. 131)

Were we reflexive?

Throughout the study, the research team consistently embedded reflection and debriefing into each iteration of the program. The participants were encouraged to engage in the co-generative dialogue defined by Elden and Levin (1991) as fundamental to participatory action research.

Were we ethical, democratic and collaborative?

Attempts were made by the team to empower all participants as equal shareholders. Working within institutional constraints did not fully allow for equal co-creation in matters such as budgeting and resource allocation. However, power-sharing was otherwise widely observed and appreciated by participants. In the context of the biomedical model of ethics laid out by Beauchamp and Childress (2001), the four principles of autonomy, non-maleficence, beneficence and justice were upheld. The particular principle of justice aligns with equal power sharing, democratic empowerment and the breaking down of power structures between the researcher and the researched as demonstrated in this study. Sue and Sue's definition of social justice within an ethical framework was also upheld in the equal power sharing and commitment to social action enacted in our study - not just between the researcher and the researched – but also within the structure of a simulation program itself (2013).

Did participants learn new research skills, attain greater self-understanding, or achieve greater self-determination?

All participants reported learning new skills through simulation – either in simulated patient sessions, in their role within the simulation program, or as a simulationist in general.

Did it solve significant practice problems?

While no practice problems were definitively solved by the current study, significant progress was made in implementing simulation within the context of the Sarah Lawrence College Human Genetics Program and steps were taken to solve noted gaps in the literature, particularly in the areas of transparency when implementing a new simulation program and representing the voices of all stakeholders in reporting the implementation.

Were problems solved in a manner that enhanced the overall learning capacity of the individuals or the system?

The overall learning capacity of individuals within the context of their role as simulationists as well as the learning capacity of the genetic counseling graduate and simulation program was increased and continues to grow. When this study began, a simulation program within the Joan H. Marks Graduate Program in Human Genetics did not exist. The current study enhanced the overall learning capacity of the system as evidenced by the completion of two hundred and seventy simulation sessions over the course of the year and by developing a simulation program which will contribute to the ongoing clinical training of future graduate genetic counseling learners.

According to the questions laid out by Dickens and Watkins, the philosophical framework of PAR was upheld in the current study, and significant actions were generated over the course of the study to expand the learning capacity in simulation of individuals and the overall system of the graduate genetic counseling program in which the study was situated.

Manifesting Simulation Best Practices

Beyond fulfilling the dictates of participatory action research, the current study also attempted to implement a simulation program that aligned with standards of best practice as laid out by INACSL (2016) and ASPE (Lewis et al., 2017) while also aligning simulation to genetic counseling – and further to the particular culture of the Sarah Lawrence College Human Genetics graduate program. ASPE lays out five domains within their standards of best practice: Safe Work Environment, Case Development, Training, Program Management and Professional Development (Lewis et al., 2017). Aligning ASPE's domains with our graduate program values of grit, perseverance,

humanism and innovation, we forged a union of simulation education and genetic counseling graduate training centered on a formative holding environment that is learner-centered. In doing so, we created a simulation program in genetic counseling that empowers co-creation of all stakeholders to build as we go, that maximizes the unique aspects of simulation and pushes all involved to their growing edge while bridging theory to practice.

Practicing psychological safety as the cornerstone of a safe work environment, our decision to make learner-centeredness a bedrock of our simulation program created a safe work environment for all involved, grounded in psychological safety, confidentiality, and respect. Our commitment to co-creation within our team with equal power-sharing among all voices meant that cases were developed with multiple iterations of revision involving key stakeholders, creating clear learning objectives, and allowing for adaptation. More learning needs to happen in the domain of case development moving forward to track changes to cases in real-time implementation. Our guiding principle of maximizing the unique aspects of simulation demanded that all members of the team received trainings and orientations throughout the implementation, including separate case trainings for SPs prior to working a case with a learner, training for giving verbal feedback and debriefing, separate trainings/orientations for each role (learner, facilitator, SP) and reflection was encouraged on the training process. Two areas of improvement identified within the domain of training would be to train for completion of assessment instrumentations, which happened only informally with the lead SP and not at all for the facilitators, and for program leadership to learn more about how to train new SPs and facilitators. Our willingness to jump in and build as we go meant we were defining the role of project management as we went. There is also more work to be done in pushing to our growing edge in project management regarding policies, procedures, and records management. Future growing edges to focus on would also be in quality management and implications of a long-term program/sustainability. An attempt was made at professional development particularly in regard to debriefing that aligned with our value of humanism and our choice of learner-centeredness, and that work will continue through future iterations. As we continue to push towards our growing edge as simulationists, we hope to fulfill the standards of best practice in simulation as we explore embedding simulation within the two years of a genetic counseling graduate program.

Lessons Learned

The current study contributes a thick description of implementation when developing a simulation program within genetic counseling education. Howley et al. indicated a weakness in the simulation literature was a lack of transparency when setting up a new simulation program and called for increased rigor in reporting research involving SP methodologies (2008). They called for not just transparency but also for adequate detail when describing SP methodologies while implementing a simulation program. The current study attempted to be transparent with how we developed and implemented simulation within a genetic counseling graduate program via thick description and careful tracking of iterative cycles of action, reflection, and adaptation in a participatory action research methodology. The researchers resisted the tendency of some other studies to jump to evaluating efficacy of a simulated patient program prior to studying implementation. Through careful attention to transparency about the practical and logistical aspects of implementation, we noted the emergence of several overarching themes that shaped and defined our particular experience of introducing a simulation program into genetic counseling training: the importance of equality of voice through co-creation and the pervasive and positive influence of alignment of values between simulation and genetic counseling.

Equality of voice through co-creation

One key aspect of our implementation of simulation within a genetic counseling graduate program was that we demanded a collaborative approach inclusive of all roles. The present study was enacted by an interprofessional team of co-creators, with simulated patients included from the beginning as equal co-creators of the program. This collaborative approach carried through to every aspect of implementation and fulfilled the value of collaboration as laid out by ASPE (Lewis et al. 2017). The role of simulationist was placed within the context of a growing mindset for the entire team, allowing for the continuous creation of a program where all voices on the simulation team were equal and exchanges of ideas were free. Reflection and debriefing were built into the foundation of the model, as each component of the program was examined from multiple perspectives and adjusted to better meet the needs of all involved. Not only was every iteration analyzed by the team – each case was trained, debriefed, and adjusted; each proposed session design was trialed, debated, and refined; all key decisions were discussed, examined, and questioned with key stakeholders holding equal voice to make change. As such, the program was able to develop at

a much faster rate than originally assumed – as less time was needed to go back and refine. All voices were represented from the beginning and key problems were identified and triaged early – allowing for exponential development of our simulation program that might have taken a much longer time with a more siloed approach.

The collaborative approach of equal co-creators building as we went also ensured that all voices were represented when documenting implementation, a key weakness in the literature identified by Pritchard et al. (2017). Jumping to evaluation and privileging learner voices lead to an under-representation of the perspectives of simulated patients and facilitators in the literature (Pritchard et al., 2017). As the genetic counseling literature is scant on how practitioners are implementing simulation within their programs, other than the recent Kessler et al. (2020) article, this study aimed to supplement the genetic counseling literature with all voices represented in implementation to strengthen the foundation of genetic counseling simulation literature. Our collaborative approach, inclusive of all roles, was able to capture and incorporate facilitator and SP perspectives, thereby representing the experiences of simulationists during planning and implementation.

Alignment of values supporting self-actualization

Another challenge when implementing a simulation program is aligning the values of the graduate program with the values of simulation. Our collaborative approach of bringing together a group of key stakeholders, or simulation champions in the organization, reflects the simulation Code of Ethics and the Center for Simulation's basic assumption: that all involved are intelligent, capable, care about doing their best and want to improve (Park et al., 2018; Center for Medical Simulation, 2020). Similarly, alignment between the Simulationist Code of Ethics and the Human Genetics Program's grounding in humanism provided for a convergence of principles that extended throughout implementation. Humanism is, in fact, a value held by the profession of genetic counseling as a whole; Resta claims that humanistic philosophy is woven into the fabric of genetic counseling (2019). He highlighted Rogers' client-centered therapy as the most direct influence on the humanistic ethos of genetic counseling (Resta, 2019). Rogers' theory that "the organism has one basic tendency and striving - to actualize, maintain, and enhance the experiencing organism" (1951, p. 487) applies not just to genetic counseling, but also to the person-centered approach we strove to create in our simulation sessions. Nestel et al. lay out key connections between humanism and simulation (2018). Synergy around humanism in both simulation and genetic counseling shaped critical

decisions made while designing and implementing simulation during this study. Key stakeholders identified that a humanistic approach would be extended to developing the individual voices of all involved: learners, facilitators, project management and simulated patients. The ethos of humanism, reflected both in our commitment to co-creation and to pushing towards our growing edge, became the bedrock of program development, guiding decisions, revisions, and adaptations throughout the entire process. Our study contributes an alignment we found through the ethos of humanism in both genetic counseling and simulation education practices.

Another way we found values mirrored between our graduate program and simulation was through consciously and continuously striving for learner-centeredness. A learner-centered educational approach is well documented in the simulation literature (Cheng et al. 2015; Blumberg, 2008; Chou, 2013; Colley, 2012; Cornelius-White, 2007; Dole et al., 2016; Herranen et al., 2018; Lee & Kim, 2018; Massoulech et al., 2012; McCombs et al., 2010; Moate & Cox, 2015; Oyelana, 2018). Cheng et al. lay out a learner-centered approach to simulation that embodies learning as an experience in which learners and instructors are involved in an active meaning making process focused on co-constructing knowledge, skills, and attitudes (2016). Our identification of a formative holding environment that is co-created among all members of the team aligns with Cheng et al.'s vision of co-construction (2015). Multiple attempts were made to operationalize a learner-centered approach within the current study: moving forward with simulation and not standardization; encouraging learners to formulate their own learning goals and use those goals to direct emphasis and attention to workshopping related skills; adapting the two-session model to balance prebrief, feedback from SP, and debrief to enhance learner reflection; introducing training workshops to scaffold the concept of learner-centered simulation for facilitators as well as emphasizing partnership in learning between learners, facilitators and SPs. Sharon Colley identified challenging aspects of implementing learner-centered philosophy within a graduate nursing educational program as understanding the philosophy, holistic implementation of the philosophical concept throughout the program, resource support and a willingness to change amongst participants, as well as having the time and scaffolding to shape the definition of learner-centered within the educational team (2012). Attempts were made to scaffold the idea of learner-centered facilitation by implementing a learner-centered debriefing workshop for facilitators. Cheng et al. lay out aspects of learner-centered debriefing that became a guide to implementing a more learner-focused facilitator role in our program: nurturing active meaning

makers, acting as a "guide on the side", centering independent, self-directed learners and establishing mutual power and collaboration (2016, p. 33). The team is still grappling with the complex concept of learner-centeredness, and ongoing reflection is needed to clarify how the concept evolves within the team and across roles.

A final contribution of this study to the literature in simulation and genetic counseling graduate education was noted in providing an example of the connection between learner-centeredness and self-directed learning. Cheng et al. discuss one of the goals of simulation as encouraging self-directed learners (2016). Grow's self-directed learning theory is well defined within the literature of adult learning (Grow, 1991; Ainoda et al., 2005; Franchi et al., 2020; Gatewood, 2019; Jons-Cox, 2014; LeFlore et. al, 2007). The Staged Self-Directed Learning model proved to be a theoretical grounding for learner and facilitator orientation and trainings. Early groups of learners expressed wanting more opportunity to explore and apply self-directed learning to their simulation experiences. A workshop was developed on exploring self-directed learning in the context of simulation and implemented as part of learner orientation. Given the abstract nature of learner-centeredness and self-directed learning, purposeful attention to these topics through discussion and training – on self-directed learning for learners and learner-centeredness for facilitators – was useful in helping us to bridge theory of simulation to practice within our simulation program and demonstrated our commitment to pushing towards our collective growing edge as a simulation program.

To move toward the growing edge of simulation in genetic counseling, this study aims to catalyze a simulation community of practice within genetic counseling education. Communities of practice, according to Wenger, are "groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly" (Wenger, 2011, p. 1). Communities of practice are made up of "practitioners…who develop a shared repertoire of resources: experiences, stories, tools, ways of addressing recurring problems—in short a shared practice" (Wenger, 2011, p. 2). A similar call was made by Pak et al. in their manifesto for healthcare simulation (2020). Answering Park et al.'s call for healthcare simulationists to come together after the intensified uptake of simulation methodologies during the COVID-19 pandemic (2020), the current study aims to generate a conversation among healthcare simulationists in genetic counseling education to build synergies around simulation program goals, share implementation techniques and resources, and engage interactively in the growth and development of simulation in genetic counseling.

Study Limitations

Several limitations of this study are readily apparent. The first concerns general aspects of PAR, such as the study being inseparable from the local context with the research practitioner embedded in the process and working closely with participants, who also serve as researchers. The situated nature of PAR – akin to other qualitative research methodologies – prevents generalizability of findings. A second limitation is that principles of PAR are in conflict with the typical procedures of a master's thesis in genetic counseling. For academic purposes, the author of this manuscript was identified as the primary researcher and tasked with proceeding independently with data analysis and interpretation without the input of all team members in a way that contradicts the value of deep collaboration in PAR. Any future dissemination of the findings of this study would need to involve the input of all key stakeholders prior to publication. The author fully intends to move forward with this step, but the compressed timeline of a master's thesis did not allow for this level of participation during the writing of this manuscript. A third limitation was that the researchers were unable to fully disambiguate roles due to constraints of time and resources, which presented multiple potential conflicts of interest – both identified and implicit – for key stakeholders, with variable perceived impact. These overlapping roles could contribute to bias in favor of simulated patients as collaborators, simulation in general, and prioritization of some competing interests over others during interactions among members of the research team.

Research Recommendations

Future research is needed to evaluate aspects (effectiveness, alternatives) of implementation of simulation within a genetic counseling graduate program. As the genetic counseling literature is scant regarding simulation implementation and practices, future research needs to build the genetic counseling literature to inform development of a community of practice for those involved in simulation in genetic counseling. Outcomes and practice implications of simulation should be explored in the context of genetic counseling. Additional research on how to train genetic counseling educators as simulationists and adapt simulation to the unique aspects of genetic counseling education would also be informative.

CONCLUSIONS

The current study of implementing simulation in a genetic counseling graduate program contributes both to the literature on simulation and to an emerging body of evidence within genetic counseling education. Due to incorporation of simulation into the Standards of Accreditation for Graduate Programs in Genetic Counseling and disruptions to traditional clinical fieldwork imposed by the pandemic, simulation within the context of genetic counseling has the potential to serve as an increasingly valuable component of clinical training. The current study documents a single instance of implementation utilizing the research philosophy of participatory action research while keeping with best practices of simulation. Thick description of implementation with transparency of methods and detailed accounts of ongoing adaptations contribute specific, authentic examples to fill a gap in the simulation literature about practical logistics of introducing new simulation programs. Key decisions of implementation were found to be intentional selection of modality to achieve specified learning objectives, specifically by choosing between simulation or standardization and formative or summative framing for feedback. Bringing together an interprofessional team of co-creators in which all members of the team were equal change agents in shaping the simulation program allowed for rapid development and implementation within the context of the COVID-19 pandemic. Aligning values of simulation with the educational philosophy of the graduate program was found to be an essential factor of successful implementation, and in this case, was constituted by a cohesive set of principles including humanism, learner-centeredness, and self-directed learning. The decision to center our simulation program on a formative, learner-centered holding environment while pushing to our growing edge as simulationists contributes to the genetic counseling literature on implementing simulation and may aid future simulation program development in other genetic counseling educational contexts. By offering a transparent study of integrating simulation within our curriculum we hope to cultivate the shared repertoire of resources, experiences and tools noted by Wenger (2011), to answer the call of Park et al. (2020) in bringing together genetic counseling simulationists and to begin to cultivate a simulation community of practice within genetic counseling.

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COMPLIANCE WITH ETHICAL STANDARDS

Conflicts of Interest

Cassandra Pisieczko declares that she has no conflicts of interest in submitting this thesis.

Human Studies and Informed Consent

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000 (5). Informed consent was obtained from all patients for being included in the study.

Animal studies

No non-human animal studies were carried out by the study team for this article.

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Appendix

Table V: Key Definitions of Simulation*

Simulation Education

- **Simulation:** A technique that creates a situation or environment to allow persons to experience a representation of a real event for the purpose of practice, learning, evaluation, testing, or to gain understanding of systems or human actions. An educational technique that replaces or amplifies real experiences with guided experiences that evoke or replicate substantial aspects of the real world in a fully interactive manner.
- **Simulation / Scenario-based Learning:** A simulation-based learning method where learners interact with people, simulators, computers, or task trainers to accomplish learning goals that are representative of the learner's real-world responsibilities. The environment may resemble the workplace. Depending on the learning objectives, realism can be built into the equipment or the environment.
  •Simulated/Synthetic Learning Methods: The principles, pedagogies, and educational strategies used in health care simulation.
- **Simulated-Based Learning Experience:** An array of structured activities that represent actual or potential situations in education and practice. These activities allow participants to develop or enhance their knowledge, skills, and attitudes, or to analyze and respond to realistic situations in a simulated environment.
- **Adaptive Learning:** Adaptive learning incorporates a wide range of technologies and techniques that observes participants and adjusts the learning experience on demand to meet the unique needs of the participants and facilitate the individual/team members in meeting the identified objectives.
- **Fidelity:** The degree to which the simulation replicates the real event and/or workplace; this includes physical, psychological, and environmental elements. It is not constrained to a certain type of simulation modality, and higher levels of fidelity are not required for a simulation to be successful.
- **Psychological safety:** A feeling (explicit or implicit) within a simulation-based activity that participants are comfortable participating, speaking up, sharing thoughts, and asking for help as needed without concern for retribution or embarrassment. The team is safe for risk taking, and mistakes will be considered learning opportunities rather than there being embarrassment or punitive consequences.

Simulation Modality

- **Modality:** A term used to refer to the type(s) of simulation being used as part of the simulation activity, for example, task trainers, manikin-based, standardized/simulated patients, computer-based, virtual reality, and hybrid. A selected type or types of simulation equipment, concept, or technique that constitutes a method of simulation use.
- **Simulated/Standardized Patient Simulation (SPS):** A simulation modality using a person/persons trained to portray a patient scenario or actual patients for health care education (SSH).A modality used for the purpose of practice, learning, assessment, or to gain an understanding of systems or human actions in which standardized (or simulated) patients play a central role.
  •Simulation Activity: The entire set of actions and events from initiation to termination of an individual simulation event; in the learning setting, this is often considered to begin with the briefing (prebriefing) and end with the debriefing.
- **Simulation Learning Environment (SLE):** A location where a simulation-based learning experience takes place, and where a safe atmosphere is created by the facilitator to foster sharing and discussion of participant experiences without negative consequences…in which trainees feel simultaneously challenged and psychologically safe to practice and reflect on their performance.
  In Situ: Taking place in the actual patient care setting/environment in an effort to achieve a high level of fidelity and realism.
- **Distance/Remote Simulation:** Implementing a simulation or training at a physical distance from the participant(s).
  Logistics: Ensuring the details, in simulation-based education, such as scheduling of learners, facilitators, moulage, props, scenario preparation and design are all complete.
- **Moulage:** Techniques used to simulate injury, disease, aging, and other physical characteristics specific to a scenario; moulage supports the sensory perceptions of participants and supports the fidelity of the simulation activity.
- **Objective Structured Clinical Examination (OSCE):** An approach to the assessment of clinical or professional competence in which the components of competence are assessed in a planned or structured way with attention being paid to the objectivity of the examination.

Simulation Roles/Logistics

- **Simulationist:** A term used to describe professionals involved in providing simulation activities, products, and services. This can include simulated patient educators, trainers, and standardized or simulated patients (SPs).
- **Simulated/Standardized Patient/Participant (SP):** A person who has been carefully coached to simulate an actual patient so accurately that the simulation cannot be detected by a skilled clinician. In performing the simulation, the SP presents the gestalt of the patient being simulated; not just the history, but the body language, the physical findings, and the emotional and personality characteristics as well. Often used interchangeably with standardized patients in the USA and Canada, but in other countries simulated patient is considered a broader term than standardized patient, because the simulated patient scenario can be designed to vary the SP role in order to meet the needs of the learner.
- **Facilitator:** An individual who is involved in the implementation and/or delivery of simulation activities.. An individual that helps to bring about an outcome (such as learning, productivity, or communication) by providing indirect or unobtrusive assistance, guidance, or supervision. SPs can also be used to give feedback and evaluate learner performance.
- **Clinical Scenario/Case:** A detailed outline of a clinical encounter that includes: the participants in the event, briefing notes, goals and learning objectives, participant instructions, patient information, environmental conditions, manikin or simulated patient preparation, related equipment, props, and tools or resources for assessing and managing the simulated experience.
- **Prompt/Brief:** The information given to learners prior to the start of a simulation.
- **Prebrief:** An information or orientation session held prior to the start of a simulation activity in which instructions or preparatory information is given to the participants. The purpose of the prebriefing is to set the stage for a scenario and assist participants in achieving scenario objectives.
- **Debrief:** An activity that follows a simulation experience and led by a facilitator…where educators/instructors/facilitators and learners re-examine the simulation experience for the purpose of moving toward assimilation and accommodation of learning to future situations.

*Key Definitions taken from the Healthcare Simulation Dictionary, 2nd Edition with Distance Simulation Addendum (Lioce et al., 2020).

Table VI: Outcomes Studies of Simulation

Critical thinking and holistic competence	Goodstone et al., 2013 Kourgiantakis et al., 2019 Lee et al., 2020 Rutherford-Hemming & Jennrich, 2013 Williams & Song, 2016
Clinical skills	Hayden et al., 2014 Barrow, 1993 Dinsmore et al., 2013 Herge et al., 2013 Kuhne et al., 2020 Swanson et al., 2013
Communication	Kaplonyi et al., 2017 Beird & Thacker, 2017 Ditton-Phare, 2016 Donovan & Mullen, 2019 Fallowfield et al., 2003 Guiton et al., 2004 Leeper-Majors et al., 2003 Lin et al., 2013 Ryan et al., 2010
Shared decision-making	Hauer et al., 2011 Theriault 2019
Psychosocial skills and empathy	Gupta & Gupta, 2020; Laughey et al., 2019 Schmidt et al., 2017 Witt et al., 2018
Increased learner self-efficacy, confidence and leadership	Leigh, 2008 Sharpnack et al., 2013 Walker et al., 2015
Developing interprofessional collaborations	Bridges, 2007 Cantillon et al., 2010 Defenbaugh & Chikotas, 2016 Murdoch et al., 2014 Wong et al., 2016