



# Two Examples of Simulations Being used to Change Attitudes Towards Parenting



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Submission: 📅 July 12, 2018; Published: 📅 November 24, 2018

## Abstract

Parenting simulations are life-like technological devices designed to emulate the physical and behavioral characteristics of real children. These simulations offer an experiential learning method that has become a popular means of demonstrating the challenges associated with infant care and parenthood across childhood. Due to the interactive nature of these simulations, they have provided a new way in which parenting can be experienced and have primarily functioned as a form of intervention designed to change attitudes, beliefs, and perceptions towards parenting. The purpose of this mini-review is to describe two examples of simulated parenting experiences: those involving a programmable doll simulation which requires infant care, and a computerized virtual experience in which a child is raised from birth to age 19 within an interactive website.

**Keywords:** Caregiver attitudes; Parenting; Relationships; Simulations; Virtual child

**Abbreviations:** BTIO: Baby Think It Over©; MVC: My Virtual Child©

## Introduction

Parenting simulations offer a new and alternative way in which caregiver-child relationships can be examined. While most individuals have their initial parenting experience with their first-born child, the development of parenting simulations allow a preliminary experience with childcare and provides an opportunity to experience child-rearing skills and decision-making. Some of these simulations are designed to offer insight into the responsibilities of infant care and demonstrate many of the burdens that accompany parenthood [1,2]. However, this has been a challenging task as parenting in real-life requires a life-long commitment that is central to lives of those who choose to be parents, and therefore is not easily replicated. Despite this, parenting simulations have been widely implemented into educational settings and used as an active learning tool, which are intended to increase student engagement, reinforce class materials and lead to higher levels of learning of abstract concepts [3].

Although parenting simulations appear to complement traditional teaching methods, it is unclear whether or not they contribute significant pedagogical value [4]. However, recent research on parenting has investigated the efficacy of simulations as an intervention strategy designed to modify attitudes, beliefs and perceptions towards different aspects of parenting. These interventions have primarily targeted populations such as teenagers and young adults that have yet to have children but may be considering parenthood in the future. The goal of this mini-review is to describe two examples of parenting simulations and how they influence caregiver attitudes: an interactive infant

doll simulation which requires hands-on care and a web-based parenting simulation which focuses on decision-making when raising a virtual child.

## Doll Simulation

Infant simulation is an experiential method designed to mimic the realistic demands of infant care and offer a prototypal child-rearing experience. In recent years, infant simulation models have dramatically transformed with the emergence of new technology, specifically, the development of the Real care Baby© by Reality works [5]. The Real care baby© simulation is a life-size programmable doll equipped with features that emulate the physical appearance and the behaviours of a six-month old infant. This includes physical characteristics such as the approximate weight of an infant, a neck that requires support, and the doll is available in several different ethnicities. Additionally, the doll is programmed to produce an array of behavioural responses such as burping, giggling, suckling, breathing, and crying.

One of the main features of the simulation is that it includes distinct cry sounds designed to signal the various needs of the infant such as feeding and diaper change to the caregiver, which will increase in intensity if neglected. However, when the appropriate care is provided, which is indicated by the insertion of a key into the back of the doll, the infant simulation will stop crying and return to a relaxed state. The episodes of crying can be pre-programmed to different infant temperaments such as "easy" (i.e., will stop crying when care is provided) or "difficult" (i.e., crying persists despite appropriate care), but overall, crying will occur in unpredictable

cycles to model naturalistic infant behavior [6]. All caregiver- infant interactions are recorded via a microprocessor located internally to the simulation device that records the positive aspects of caregiving (e.g., feeding, rocking, clothes changes) and the negative (e.g., mishandling, neglect, exposure to aversive temperatures).

The most commonly used Real care Baby© simulation has been the “Baby Think It Over©” (BTIO) program, which has been implemented into high school curricula in some areas as a means of teaching sexual education and pregnancy prevention. The role of BTIO as a school-based intervention is to assign parental responsibilities to adolescents to promote the understanding of the challenges associated with infant care with the intent to reduce teenage pregnancy rates. This is predicated on the idea that adolescents will recognize the realities of parenthood and therefore will take measures to avoid pregnancy until later in life. In some ways this is done by presenting a less glamourized view of teenage pregnancy such that the BTIO program introduces many of the burdensome aspects of infant-care as well as demonstrates the radical lifestyle changes that accompany parenthood. In turn, this can function to reduce preconceived notions that parenthood is easy and manageable at a younger age. In general, the BTIO program has been well received in classrooms and has been positively viewed by parents and teachers, especially in terms of starting a dialogue about sexual health and the responsibilities of parenting [7,8]. However, much of the previous research conducted on the efficacy of BTIO has yielded inconsistent results.

Several studies that have examined the efficacy of BTIO as a school-based intervention posit that it is an asset to sexual education and family-studies curricula, particularly modifying attitudes and beliefs about childcare, parenting, and future planning. For example, Strachan & Gorey [9] investigated the effect of BTIO as an intervention tool on the attitudes and beliefs toward child-rearing in 48 at-risk high school students. The intervention required students to continuously tend to the infants’ needs for a period of three days and three nights. Results indicated that students that completed the task reported having a greater and more realistic understanding of the responsibilities associated with infant care, specifically that the student’s response to a distressed infant may not be as patient as they had initially believed.

Other studies have reported that the primary role of infant simulators is as a supplemental teaching aid and that they function effectively as an intervention when used in conjunction with a well-constructed academic curriculum rather than as an independent intervention tool. For example, Roberts & McCowan [10] compared the efficacy of curricula with and without an infant simulation component in a sample of 236 students between the ages fourteen to eighteen. All students were required to care for an infant doll for a total of three days, however, only the experimental group completed a five-week parenting curriculum prior to caring for the doll. It was found that students whom experienced both the curriculum and simulation reported a positive change in attitudes toward sexuality, parenting, and the practical aspects of parenthood such as resource consumption, the challenges, and the patience that parenting requires.

In addition, students that had only experienced the infant simulation gained practical childcare skills even in the absence of an academic curriculum. Overall, this suggested that the simulation can function independently as a form of intervention to teach child care skills but has a greater influence on beliefs and attitudes toward parenting when used as a curriculum enhancement tool. Additionally, it has been noted that the simulation demonstrated the impact that parenthood would have on other aspects of everyday life and the additional pressures that come with teenage parenthood such as an a negative impact on academic performance, restrictions on social life, effects on family and romantic relationships, and future life-plans [11], as well as the disruption of daily routines such as homework, housework, leisure, and, sleeping patterns [12].

It has been suggested that these changes in attitudes have both immediate and long-term effects. For example, McCowan et al. [1] examined the effects of infant simulators as an intervention in a sample of students enrolled in health education classes from seven different high schools. Depending on the school, participants either completed a sexual education curriculum that included using the simulation or completed the curriculum but did not use the simulation. All participants were required to complete an online survey at three times during the study: before, after, and nine months following the intervention. The survey included 25 attitudinal items designed to assess dimensions of parenting such as knowledge, pragmatics, responsibilities, and social aspects. Survey data showed that students that had completed a program that included both a comprehensive curriculum and infant simulation component scored significantly higher on parenting attitudes than did the comparison group immediately following intervention.

This effect was particularly strong for the knowledge and responsibility dimensions and demonstrated that exposure to the program had a positive impact on attitudes towards parenting such as the importance of pregnancy prevention, the recognition that parenting is a life-altering commitment, and basic knowledge of infant care skills. Follow-up data revealed that these results were sustained over time and even demonstrated a greater discrepancy between groups on the pragmatics dimension such as the time, money and effort that is required to raise a child. Similarly, Didion & Gatzke [13] examined eleventh grade students and their attitudes toward parenting and sexual practices two to three years following completion of the program. Focus group and self-report responses showed that participants retained information from the program such as the consequences of teen parenthood, the intent to postpone pregnancy until later in life, and several reported that the infant simulation should be considered as a mandatory component of high school sexual education curricula.

A limitation that has emerged when using a high school sample is that many have already engaged in some form of sexual activity. Consequently, this may inhibit the simulations’ ability to function as a “prevention” tool, and therefore has minimal impact on postponing sexual activity. Many studies have found that the BTIO program has had positive results when employed in younger populations that target perceptions and attitudes prior to becoming sexually active. For example, Barnett & Hurst [14] assessed

attitudes toward parenting following the completion of the BTIO program in a sample of eighth grade and tenth grade students from twenty schools in a rural area of a Southern U.S. State. Self-report data combined with the BTIO output suggested that participants from both age groups had taken the assignment seriously and had increased their understanding of the challenges of parenting, particularly with single parenthood.

Furthermore, sixty-five percent of the sample agreed that the program contributed to their decision to postpone sexual activity until later in life. Although both groups were impacted by the use of the simulation, the results suggested that it had a greater effect on the eighth-grade students than it did for the tenth-grade students. In another example, Divine & Cobb [15] used a similar infant simulator called Ready-Or-Not-Tots® in a sample of predominantly white, middle-class, eighth grade students. Unlike other studies, the students were required to care for the infant for a longer period of time of eight days rather than two or three days. Throughout the duration of the program, students were required to document their thoughts and feelings about caring for their doll and what they had learned. Results showed that up to two years after the experience, students that had experienced the simulation had retained information about the implications of parenting such as loss of freedom, expense, emotional strain, and responsibilities of infant care. As infant simulations have mainly been used as a parenting awareness and pregnancy prevention tool, it is no surprise that the majority of research has used a middle-school or high-school samples. However, some studies have extended the use of infant simulations into undergraduate settings. For example, De Cock et al. [16] examined the effect of a crying infant simulation in a sample of 116 undergraduate students, none of which had children of their own. All participants were required to care for the doll for a total of ten minutes, however, the simulations were pre-programmed to one of three possible conditions: no cry, intermittent cry and continuous cry.

Participants were required to complete a questionnaire before and after the experiment to assess anxiety levels, affect, and expected parenting self-efficacy. It was found that students that were exposed to either of the crying conditions reported increased negative effect, increased anxiety, and overall felt less confident about their ability to parent in the future. In sum, this suggested that the simulation had an effect on the student's future planning and a better understanding of the preparation required to provide adequate infant care. Jang & Lin [17] investigated the learning effects of infant simulation in a sample of undergraduate students in Taiwan taking a family studies course in which they were required to care for the doll for 48-hours. Collectively, the simulation output, questionnaire responses and student personal reflection showed that students better understood the burden of childcare, the social disapproval associated with being a young parent, the importance of open communication with significant others and, the many support systems involved in raising a child.

Although there has been support for the use of infant simulation as a form of intervention, several studies contend that it has

minimal efficacy as a comprehensive pregnancy prevention tool. For example, Out & Lafreniere [18] used BTIO as an intervention on 114 eleventh grade students, to examine whether or not BTIO was an effective tool for helping adolescents to recognize their personal risk for an unplanned pregnancy. They hypothesized those students that had to care for the infant doll for a period of three days would have a greater awareness of the implications of teenage parenthood. Although it was concluded that the program did increase the accuracy of adolescent assessments of their potential risk to unplanned pregnancy, there were no significant differences between groups on negative attitudes towards pregnancy and had little impact on attitudes towards sexuality such as abstinence and use of contraceptives.

Similarly, studies have found that knowledge about sex, attitudes towards adolescent sex, parent-adolescent communication, and sexual behavior did not differ significantly between groups that used the BTIO program and those that did not, and therefore have attributed changes in attitudes to the curriculum rather than the simulation [19]. Findings such as these have led to the general consensus that infant simulation paired with a sexual education curriculum are useful for changing attitudes, cognitions, and knowledge about parenthood, but have minimal influence on changing sexual behavior or functioning as a pregnancy deterrent [4]. Other studies have suggested that the inefficacy of parenting simulations, in some cases, may be due to the finding that the BTIO program is limited by its inability to replicate an authentic parenting experience, and therefore may not be equated to real infant care [20,21]. It is evident that programs that use a doll simulation paradigm have been a popular tool for teaching various aspects of child care and offers insight into what it may be like to parent a child for the first time. The use of infant simulators has been particularly advantageous in populations that do not yet have children of their own such as adolescents and emergent adults. However, programs such as BTIO are limited by the child age-range in which parenting can be examined, as they are generally a static experience which solely offers the opportunity to care for an infant approximately six months of age for the entirety of the program. In turn, this neglects the developmental aspect of childcare and fails to reflect the variety of challenges that occur across the child's lifespan. With this, doll simulation does not always represent a comprehensive account of the commitment of parenthood, as parenting in real life is a life-long commitment that is accompanied by a diverse set of challenges that vary with a child's age.

### Computer Simulation

Another way in which parenting can be simulated is to create a computerized parenting simulation in which a child is raised from birth to age 19. This would provide a dynamic means of experiencing parenting and child development. One example of a computer simulation which also could lead to education and parenting attitude change is My Virtual Child® (MVC). This is an online parenting simulation that enables students to assume the role of "parent" to raise a virtual child from birth to 19 years of age [22]. A unique feature of the MVC program is that it offers a longitudinal approach

to simulated parenting, and therefore presents a greater range of parenting challenges that extend beyond childhood and into late adolescence. It is useful to know how this program functions. At the beginning of the MVC program, parents are prompted to create an avatar based on physical characteristics such as skin tone, hair colour, and eye colour, which allows for ethnic diversity. The parent then completes a series of questions about their personality traits, areas of intelligence and past childhood experiences.

Collectively, this information is integrated into the simulation program and used to develop an individualized child-rearing experience according to an algorithm, i.e., to some degree the child develops similar to the parent, not unlike in real life. The child is then “born”, and the parent proceeds to make 256 multiple-choice irreversible parenting decisions as the child progresses through infancy, childhood and adolescence. Throughout the program, the child’s development is made contingent upon several factors such as the child’s “genetics” (determined by student responses to initial questions), unpredictable life-events which occur randomly to some (e.g., divorce), and the decisions made by the parent. In turn, the parent occasionally receives feedback in a “story-like” sequence on the child’s progress in the form of reports from the child’s pediatrician, psychologist, and school report cards. These reports include information on the child’s developmental progress such as important milestones, major life-events, grades, and psychological well-being. The MVC program was developed as an ancillary to college-based child development courses and requires students to document self-reflections in the form of assignments throughout the duration of the program.

In recent years, the use of parenting simulation as a learning tool has become increasingly more popular as a form of active learning. The intent being that a practical experience will increase student engagement and enhance educational experiences. As the MVC program was designed with the intention of providing an interactive learning experience, several studies have been dedicated to investigating the programs efficacy and pedagogical value. For example, Zimmermann [23] demonstrated that students enrolled in an undergraduate child development class that completed the MVC program reported having greater student engagement in the course as it helped the connectivity between class material and the real world. These students displayed a significant increase in academic performance compared to those that solely used a textbook. Similarly, Anderson et al. [24] found that high school students, when required to collectively raise a virtual child, significantly improved their knowledge of child-rearing and parenting.

In addition to the academic benefits of MVC, research suggests that it is effective in changing attitudes and perceptions towards parenting. For example, Graves [25] investigated the use of MVC as an alternative form of field work in pre-service teacher courses. Following completion of the program, pre-service teachers reported having an increase in their ability to think critically about parenting (specifically the effect parental decisions have on child

development), a change in perspective toward the challenges of being a parent, and an increased understanding of how this can be applied in a real-world setting. Most recently, this area of study has expanded to include attachment relationships and how they can be examined using the virtual parenting experience. Symons & Smith [26] found that students enrolled in an undergraduate developmental psychology reported that MVC was a useful teaching aid that helped with learning and critical thinking, but in addition, students also felt as if they had formed a relationship with their virtual child and expressed many positive emotions such as happiness and pride when asked how they felt about the child. Parenthetically, screen captures of their “child” were apparently posted on social media, students were discussing their parenting experience with their own real-life parents and re-evaluating their own behavioural tendencies as teenagers from the perspective of their parent (now that they were one).

Expanding upon these findings, Symons, Adams & Smith [2] used MVC to examine the relationship between adult attachment style and caregiver attitudes toward a virtual child based on theoretical background that attachment and caregiving are interrelated systems [27]. In their study, students completed attachment style measures to assess anxiety and avoidance in their own personal relationships before and after raising a virtual child, as well as some attachment-informed caregiver attitude measures after the experience. They found that avoidance in their own personal relationships predicted more negative caregiver attitudes towards the child.

These findings were systematically replicated by Symons et al. [28] and extended by having students complete a standardized measure of their anticipated parent-child relationship before the experience and their actual feelings about the relationship afterwards. They found that five of seven dimensions of the parent-child relationship actually became more positive as a result of raising a virtual child, for example, more satisfied with parenting and more supported in their role. While the pedagogical goal of the MVC program is to learn concepts about child development and parenting, there clearly is another impact on student’s attitudes such as feeling greater self-efficacy and confidence about the parenting experience that some were initially skeptical about. The MVC parenting paradigm thus has potential to be used beyond the classroom in groups such as potential parents expecting a first-child, as well as educate parents-to-be about challenges across childhood

## Conclusion

This mini-review describes two different ways in which parenting simulations have been used to educate and change attitudes, largely in adolescence, early adulthood, and prior to becoming an actual parent. A unique aspect of both forms of simulation is that they provide an accessible means of studying topics such as parenting and attachment that are typically hard to access in a younger demographic. It is evident that parenting

simulations have become a valuable pedagogical resource that demonstrate how an experiential learning component can be effective in changing attitudes, beliefs and perceptions about various aspects of parenting. Overall, these findings suggest that parenting simulations can be a useful tool to increase student engagement to reinforce and encourage retention of course material. This has been done by providing students with a concrete child-care experience which has enabled many to think differently about aspects of parenting such as the consequences of teenage parenthood, child care skills, parenting knowledge, and decision making. Although this is considered an advantage, it is important to emphasize that previous research using these simulations has primarily examined populations that do not have children and have been conducted within an educational or experimental setting. Therefore, it might be useful to apply these types of interventions in populations that do not have access to educational institutions, particularly for those considering parenthood in the future. Furthermore, as both types of parenting simulations are relatively new forms of technology further research is required to better understand their efficacy of changing attitudes toward caregiving.

### Acknowledgement

The first author was supported by a Canada Graduate Scholarship-Masters (CGS-M) by the Social Sciences and Humanities Research Council of Canada (SSHRC). The second author was supported by an Insight Grant from SSHRC. Authors thank Frank Manis for personal communications about the development and function of My Virtual Child ©.

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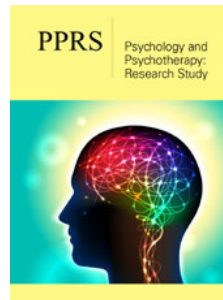
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