Game Mechanics to Promote New Understandings of Identity and Ethnic Minority Stereotypes

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Abstract
The following paper discusses the design, creation, and evaluation of a new class of digital games, Identity Supportive Games, as a tool to promote new understandings of self-identity and ethnic minority stereotypes. In particular, aspects of the Asian-American experience, including the effects of Asian stereotypes like the “Model Minority” myth, were targeted. In this design-based research study, qualitative and quantitative data sources explored the impact of game mechanics within Identity Supportive Games on both Asian-American and Non-Asian participants. Items investigated include: perceptions of Asian-American stereotypes, the ability to promote reflections and thoughts on self-identities and goals, the learning of facts regarding the Asian-American experience, and new understandings of Asian-American culture.

Keywords: Social issue games, identity, ethnic minorities, stereotypes

In a digital age where 97% of all American teenagers play computer, web, portable, or console games (Lenhart et al., 2008), there is a need to better understand the potential of using video games as a tool to support positive youth identity development in the face of racial and societal stereotypes that can be damaging and limiting in social and psychological ways (e.g., Sue & Sue, 2006; Mok, 1998; Cheryan & Bodenhausen, 2000). To date, very few game-based interventions for addressing cultural identity formation and the mitigation of stereotype threat (Steele, 1997) exist. Instead, stereotypical images and roles are pervasive in the most popular commercial video games, including African-Americans depicted frequently as gang members and athletes (Consalvo, 2010) and women portrayed as damsels in distress or hypersexualised objects (Lee et al., 2006). Digital games often embody values that reinforce stereotypes and stereotypical behaviour (e.g., ethnic minorities that engage in violent and delinquent behaviour in games like Rockstar Games’ popular yet controversial Grand Theft Auto titles) (Flanagan, et al. 2007). In this study, game mechanics were created and tested in two digital mini-games to explore the possibility of mitigating stereotyping of the Asian-American community, providing implications for extending the process to other populations as well.

Focusing on Asian-American culture, the fastest growing racial/ethnic group in America (Humes et al., 2011), is strategic for several reasons. Despite commonly being labelled as a “Model Minority” group that regularly achieves academic success, Asian-American youth often face serious issues and challenges in society that largely go unnoticed and unaddressed. These include: (1) the effects of widespread stereotypes, some of which are overtly negative (e.g., “Asian men are emasculated, passive individuals unfit for leadership positions”) (Mok, 1998; Kim & Yeh, 2002) and other stereotypes that may seem positive initially, but are in fact damaging or limiting (e.g., “Asians are exceptionally smart nerds who are great at math and science”) (Lee and Zhou, 2004); (2) a “toxic shame” culture that masks real problems that need to be addressed, including the stigma of...
mental illnesses (Yoon & Jepson, 2008); (3) “invisible” Asian groups masked by the Model Minority image who tend to struggle at the bottom of the academic curve yet are denied the assistance they need to improve (Walker-Moffet, 1995); (4) parental, cultural, and societal pressures to succeed and meet sometimes unrealistically high expectations of the “Model Minority” image (Wang & Lin, 2005; Lee, 1996; Cheryan & Bodenhausen, 2000), sometimes leading to depression, mental illnesses, and relatively high rates of suicide (Cohen, 2007); and (5) the “caught between two worlds” cultural clash between traditional Eastern and Western values that leads to role confusion and identity crisis (Erikson, 1968). There is a need for a broader awareness of issues and problems facing Asian-Americans today, as well as novel strategies for ethnic minority identity development and self-empowerment.

Digital games can be designed to have intrinsic properties that may be promising for addressing this need. Games can be experiential; they can deliver powerful first-hand learning experiences in ways that are unavailable in real life (Barab et al., 2006). Games can offer direct feedback; they can get players to see immediate consequences to their actions (Chen, 2007). Games are typically a safe place to experiment and fail (Gee, 2007); they permit players to safely try out behaviours and strategies without fear of judgment. Games can naturally afford new perspectives and opportunities for empathy (Bers, 2001; Gee, 2005); they allow players to take on new perspectives and to see the world from this new lens. Finally, games offer the potential for powerful identity play, self-representations and self-exploration (e.g., Kafai, Fields & Cook, 2010; Turkle, 1995); the experiences that occur within these environments can yield powerful insights and reflections about oneself.

This article presents a design-based research study exploring how digital game mechanics can be designed to promote new understandings of identity and ethnic minority stereotypes. The overarching research question is: can game mechanics be used to promote new understandings of identity and ethnic minority stereotypes? The paper begins with a discussion of the issues that Asian-Americans face, including the unanticipated consequences of various stereotypes perpetuated by media and society. Next, it presents the opportunity of using digital games and why game mechanics can be utilised to address the need described above. This is followed by the design process, creation, and evaluation of Identity Supportive Games, a new class of Serious Games that targets the central issues related to the Asian-American experience captured by a survey and focus group session. Specifically, the study focuses on the ability of the game mechanics to shift perceptions and clarify misconceptions regarding Asian culture and stereotypes, the effectiveness of the games as an educational tool to improve knowledge of facts related to Asian culture, and the ability of the games to promote reflections and new understandings of self-identity.

**Background and Need**

Asian stereotypes are frequently perpetuated in media and pop culture, portraying images of Asians in movies and television shows such as Model Minority, nerd, overachiever, studious, mystic warrior, socially awkward, perpetual foreigner, bad leader, hypersexualised female, and effeminate male (e.g., Lee, 1996; Mok, 1998; Lee & Zhou, 2004; Kim & Yeh, 2002). Yee (1992) has argued that portrayals of Asian-Americans are dualistic in that they tend to alternate from extremely positive (e.g. wise sages, exemplary citizens) to extremely negative (e.g. sadistic executioners, sly villains). Yee has hypothesised that American attitudes toward Asians carry strong evaluations of Asians as alien competitors of two forms: exemplary and pernicious. He believes that these stereotypes have the power not only to influence attitudes and behaviours toward
Asian-Americans, but also to influence the attitudes and behaviour of Asians themselves.

Stereotypes may also lead to subtle or direct forms of racism or discrimination against Asian-Americans that limit workplace opportunities and career advancement. Negative perceptions of Asians’ capability and likelihood of success in managerial and leadership positions have led to a glass-ceiling effect dubbed the Bamboo Ceiling (Hyun, 2005): Asian-American men with equivalent or superior education and experience levels receive less income and access to resources (Fisher et al., 2000; Lee, 1996) and are excluded from upper managerial jobs on the basis of subjective factors such as ‘lack of leadership potential’ or ‘inferior communication ability’ (Cheng & Thatchenkery, 1997; Wong and Nagasawa, 1991). A study by the Anti-Defamation League found that compared to other ethnicities, Americans do not want to work for Asian-American CEOs and would feel uncomfortable voting for an Asian-American presidential candidate (ADL, 2001). Furthermore, the notion that Asian-Americans are hard workers who rarely complain has often led to the exploitation of Asian-American employees (Choi & Chen, 1996).

Stereotypes assigned to Asian-Americans can also create resentment or conflicts among peers. Fisher et al. (2000) found higher levels of distress from peer discrimination in Chinese and Korean students than in African Americans, Hispanics, and Whites. In extreme cases, stereotypes and beliefs related to race and ethnicity can lead to violence and racially motivated hate-crimes, such as the case of Vincent Chin, a Chinese-American murdered by two White men who lost their jobs. According to a recent FBI Hate Crime Statistics report, more than 65% of hate crimes were related to race and ethnicity (FBI, 2007). Stereotypes can lead people to assume characteristics about an individual, even if entirely unfair or untrue. A better understanding of areas of common ground and cultural differences may help to reduce the presence of negative or inaccurate stereotypes, which may in turn reduce violence or hate crimes.

A review of the social psychological literature has also shown that stereotypes can affect both short-term academic performance and long-term identity. Steele (1997) describes stereotype threat, a phenomenon in which academic performance is depressed when negative stereotypes about a group are evoked. This phenomenon, replicated in over 100 studies in the last decade, has a direct and immediate effect on a testing situation that evokes it, as well as a cumulative erosive effect over time that influences both intellectual performance and a longer-term sense of identity (Steele, 1997). Stereotypes can also lead to increased self-imposed pressure and emotional distress (e.g., Kim & Yeh, 2002).

What about the effects of seemingly beneficial or ‘good’ stereotypes? Prejudice (in the form of preferential treatment or high expectations) can also work in favour of an Asian-American in certain contexts, but interestingly, even these seemingly positive attributions often cause detrimental effects that are not readily apparent. For example, the belief that Asian-American students are intelligent and hardworking may cause a teacher to grade more positively. In the long run, however, harmful side effects often develop. A student may strive to maintain his or her hardworking image by being obedient and conforming, pigeonholing himself or herself, or else a student who rebels against these stereotype-driven expectations faces the wrath of his teachers for violating their notions or expectations of a ‘good’ Asian (Sue & Sue, 2006). Furthermore, Asian-Americans who do not perform well academically are often denied the assistance they need to improve (NCAAPIRE, 2008). While certain Asian-American groups of Chinese, Korean, and Japanese descent have been relatively successful, the Model Minority stereotype masks the fact that many Asians (particularly those from Southeast Asian countries like Laotian, Hmong, Cambodia) actually fall into the highest poverty
rate and lowest academic success rate levels (NCAAPIRE, 2008). Stereotypes can often render these students invisible.

Evidently, damaging consequences are not limited to overtly negative stereotypes, but to seemingly complimentary or positive ones as well. Research findings suggest that stereotypes can increase anxiety, stress and expectations to succeed, while negatively affecting academic performance (Lee, 1996; Cheryan & Bodenhausen, 2000). Furthermore, in terms of shaping self-concept, Asian-Americans are constantly reminded that they are anything but ‘normal.’ (Wong et al. 1998; Kim, 1997; Oyserman, 2006; Kawai, 2005; Mok, 1998). Asian-Americans may start to believe these perceptions and internalise stereotypes held about their group as a result of a Reflected Self phenomenon in which they come to see themselves as they believe others see them (Tice & Wallace, 2003). Finally, Asian-Americans must confront a cultural clash caused by being situated in two completely different worlds in direct conflict: an Asian heritage and its value system colliding with a Western value system.

**Consequences of Identity Crisis: Caught Between Two Worlds**

Erikson (1968) coined the term *identity crisis* to describe the most important conflict human beings encounter as they go through eight developmental stages in life. According to Erikson, an identity crisis is a time of intensive analysis and exploration of different ways of looking at oneself, struggling between feelings of identity versus role confusion. Marcia (1968; 1993) extended Erikson’s work, describing identity achievement as the most secure identity status, i.e., commitment to a secure identity. Asian-Americans face an additional challenge as they go through the developmental process of formulating identity achievement, as the challenge of negotiating between two clashing worldviews further exacerbates identity crisis (Sue & Sue, 2006). As Lee and Zhou (2004) put it, “native-born Asian-Americans find themselves caught between two vastly different worlds and at ease with neither” (p. 14). American and Asian cultures generally have contradictory values and standards over several fundamental issues including risk aversion, individualism/collectivism, power distance, and other civil liberties (Hofstede, 1980). In heavily Confucian-influenced Asian nations, for example, parents typically exert strong, heavy-handed control over children, guiding important choices in their lives, including constraints on possible career choices (Leong & Serafica, 1995). Emphasis is placed on obedience to authority and elders, obtaining a good education, and giving the family a ‘good’ name, which tends to result in greater passivity and less autonomy in individuals (Sue & Sue, 2006). Simultaneously, Western values assail Asian-Americans on multiple fronts including mass media, peer circles, and schools. Emphasis on individual personal freedoms, assertiveness, spontaneity, and risk-taking can be in direct conflict with Asian values of deference and reserve (Hofstede, 1980).

The consequences of identity crisis and being caught in between two vastly different worlds are multifaceted. Some Asian-Americans struggle to find their role in society. They must wrestle with their sense of self-worth and identity, and how much to listen to (or reject) various influences pulling in multiple directions: cultural and parental pressures, peers, stereotypes and societal expectations of what niches are appropriate or desirable for Asians, etc. (Wang & Lin, 2005; Leong & Serafica, 1995). Concurrently, Asian-Americans must deal with pressures to succeed and high expectations to live up to the smart, hard-working “model minority” image (Cheryan & Bodenhausen, 2000; Lee, 1994). These pressures and other reasons can often lead to a host of self-image and mental problems, including lower self-esteem and a distorted sense of self-worth (Cohen, 2007; Sue & Sue, 2004).
There is a need to allow Asian-Americans to understand, overcome, and take ownership over stereotypes that can adversely shape their self-concepts and social identities. Along with a need for novel strategies for ethnic minority identity development and self-empowerment, there is also a need for a broader understanding and awareness of issues and problems facing Asian-Americans today.

A possible tool to address issues of identity and stereotypes

A possible approach is to allow exploration of both identity and sociocultural issues is the use of digital games. In recent years, digital games have gained acceptance as a means to educate, promote new ways of thinking, and change perceptions and opinions (e.g., Bogost, 2007). The following section discusses how digital games can be designed with mechanics and dynamics that can make them an effective strategy for addressing issues of stereotypes.

Using digital games to promote new cultural understandings

Games are useful in the ways in which they can allow people to reflect on their own identities, fantasies, and hopes in the world (Gee, 2005). The experiential nature of digital games combined with the emotional investment of identity play offer an opportunity to increase one’s empathy toward a group. For example, people who are not Asian-American can experience the effects of specific Asian-American stereotypes in a simulated way. These kinds of games can raise awareness about important issues or persuade individuals to take a particular stance on various issues (Bogost, 2007).

Similarly, role-play elements found in many games are useful for allowing players to take on new perspectives. Players see the world through unique new lenses as they embody a game’s playable characters—for instance, soldiers in the U.S. Army in a game like America’s Army, doctors who must properly diagnose patients in a virtual Heart Murnur Sim, or possibly (in this context) ethnic minorities who must confront and negotiate cultural stereotypes. Taking on new perspectives while playing realistic game characters is a natural opportunity for people to explore new values and ways of thinking, and to open up new epistemic frames or future learning trajectories (Shaffer, 2005).

The immediate feedback and content that can be delivered in a simulated and experiential way can lead to important forms of cultural learning: myths can be debunked, misunderstandings clarified, and naïve views can be replaced with more sophisticated understandings of Asian culture. Players may develop a heightened sense of cultural sensitivity as a result of these experiences.

Toward a working game design

It is important to explore how game designs can be used as tools for better understandings of cultural issues, and to go a step beyond that: to determine how technology can support identity development. The following section discusses the design process of creating two games that promote self-reflection, positive identity support, and new cultural understandings.

A new form of social issue game design, Identity Supportive Games (hereafter called ISGs), was created to target self-reflection, identity development, and new cultural understandings. This design is based upon studies of identity-based learning (e.g., Lee & Hoadley, 2007) and social psychological literature on possible selves (e.g., Markus & Nurius, 1986), stereotypes (e.g., Cheryan & Bodenhausen, 2000; Sue et al., 2007), and digital game-based identity play (Turkle, 1995; Gee, 2005)
An ISG is a digital experience that incorporates game mechanics and dynamics that are specifically designed to:

- Allow young people to reflect upon their self-concept and possible selves (Markus & Nurius, 1986)
- Provide support for identity formation and development towards identity-achievement (Phinney, 1993; Marcia, 1966, 1980) by clarifying and improving perceptions of one’s self-concept and goals
- Allow young people to try on new identities and refine their existing identity via fluid, malleable identity play (Bers, 2001; Turkle, 1995)
- Allow young people to challenge assumptions and confront negative forces that cause unwanted behaviour (e.g., raising awareness of, and encouraging a person to take ownership over limiting, damaging stereotypes)

In this way, ISGs serve as social simulations designed to target real-world themes and important social issues including ethnic minority discrimination and the consequences of allowing ethnic minority stereotypes to go unchecked. They provide a relatively safe environment for individuals to explore aspects of their self-concepts and to learn new truths about a specific culture. Understanding one’s identity, including one’s unique strengths and goals, is important for a person to ultimately develop a positive self-concept about who he or she is.

**Game Design, Data Collection and Methodology**

The first cycle of a mixed-methods Design-Based Research (DBR) approach (Barab & Squire, 2004; DBRC, 2003) was used in order to capture a rich picture of the design and evaluation process of Identity Supportive Games. This study was broken into two phases: (1) a requirements-gathering phase to help with the brainstorming and initial design of the games, and (2) a play-test and data-gathering phase. For the first phase, a survey, focus group session, and iterative paper prototyping technique was used to determine the requirements and features of the game design. For the second phase, three main data collection strategies were used: (1) a pre- and post-survey given before and after gameplay; (2) real-time feedback in the form of ‘thinkalouds’ and server-side game logs during gameplay, and (3) focused semi-structured interviews.

The purpose of the study was to better understand how mechanics in digital games could play a role in supporting identities and promoting reflection and learning about an ethnic minority culture. The study includes descriptive work of what participants believe about ethnic stereotypes, how they view themselves in relation to ethnic stereotypes, and how they define their own self-identities. As a design-based study, it contributes an important first step of investigating how game mechanics can help participants learn (about cultures and about selves) and also offer a window into how technology may help participants move closer towards identity achievement (Phinney, 1993; Phinney, 1990; Marcia, 1966), a complex multistep process.

**Phase One: Identifying Content Requirements, Feedback and Brainstorming**

As a DBR study, a primary goal was to embody theories into game mechanics and to build new theory. To identify the content to include in the games, the most pressing issues related to the Asian-American experience were identified. Informed by a literature review on Asian stereotypes and their consequences, a survey and focus group session was completed to capture existing assumptions, conceptions, and stereotypes.
related to Asian issues and culture as well as what Asian participants perceived to be the most important aspects of their ethnic and social identity.

The initial survey was administered in an online format to thirty-two Non-Asian undergraduate students who were enrolled in a junior level technology course. All survey participants were given a gift certificate for ice cream and were entered in a prize drawing to win a gift certificate at an online retailer.

The survey contained five open response questions that allowed the researcher to explore participants’ existing assumptions, conceptions, and stereotypes related to Asian issues and culture. The first question tested survey respondents’ awareness of diversity in terms of Asian countries in the world: “In your estimation, how many Asian countries are there in the world?” The correct answer of 47 was rarely obtained; for the thirty-two survey respondents, the mean number of Asian countries was determined to be 23.07 (SD=12.86). When asked, “What words come to mind when you think of people of Asian descent?” Non-Asian survey respondents listed their conceptions about Asian culture, describing several words that were consistent with existing literature on Asian stereotypes (e.g. Mok, 1998; Kim & Yeh, 2002). Participants were also asked: “What are common beliefs that people have of the Asian ethnicity?” “What aspects of Asian and Asian-American culture are positive?” And “What aspects of Asian and Asian-American culture are negative?”

Various themes emerged from the open response items, including Asians as a group that is considered smart, a Model Minority, having abnormal physical characteristics, good at math, science, or technology, foreign, and so on. See Table 1. below for a breakdown of various themes from the survey respondents.

Table 1. Non-Asian survey responses on their conceptions of Asian people.

<table>
<thead>
<tr>
<th>Themes</th>
<th>Participants supporting this theme</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>smart</td>
<td>P2, P7, P8, P9, P15, P17, P19,</td>
<td>“intelligent,” “very smart,”</td>
</tr>
<tr>
<td></td>
<td>P20, P21, P25, P31</td>
<td></td>
</tr>
<tr>
<td>lack of awareness of unique</td>
<td>P2, P4, P17, P18, P20, P23, P24,</td>
<td>“I think of China and Japan,” “China, Japan, and Korea”</td>
</tr>
<tr>
<td>Asian countries beyond China,</td>
<td>P30</td>
<td></td>
</tr>
<tr>
<td>Japan, and Korea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model Minority</td>
<td>P3, P6, P7, P12, P15, P21, P23,</td>
<td>“overachievers,” “hardworking,”</td>
</tr>
<tr>
<td></td>
<td>P32</td>
<td>“industrious,” “diligence,” “They study more than most people,”</td>
</tr>
<tr>
<td>abnormal physical features</td>
<td>P3, P7, P8, P12, P16, P22, P26,</td>
<td>“squinty eyes,” “very skinny, short,”</td>
</tr>
<tr>
<td></td>
<td>P27, P31</td>
<td>“slanted eyes,” “undersized penises”</td>
</tr>
<tr>
<td>good at math, science, or</td>
<td>P1, P3, P4, P10, P11, P12, P13,</td>
<td>“good at math,” “science,” “tech support,” “good at math and computers,”</td>
</tr>
<tr>
<td>technology</td>
<td>P29</td>
<td>“math wizards”</td>
</tr>
<tr>
<td>strange/”other”/foreign</td>
<td>P2, P7, P16, P22, P26, P27, P29,</td>
<td>“accent,” “strange,” “immigrants,” “not as willing to assimilate into</td>
</tr>
<tr>
<td></td>
<td>P31</td>
<td>“American culture,” “They eat very weird food”</td>
</tr>
<tr>
<td>Parental pressure/respect of</td>
<td>P3, P4, P9, P16, P26, P32</td>
<td>“strict parents,” “respect of elders”</td>
</tr>
</tbody>
</table>
The survey data was used to inform a focus group session centred on Asian-American themes and issues, exploring how stereotypes are embedded in life experiences and how they are negotiated in formulating one’s ethnic identity and self-concept. As part of an Asian-themed social event sponsored by an undergraduate student organisation at a large public university, a group of 11 undergraduate students (8 male, 3 female) participated in a one-hour focus group session. Of these students, 7 self-identified as Asian-American (having mostly grown up in the Eastern cities and suburbs of the United States), 2 as African-American, and 2 Caucasian (one Hispanic male from Guatemala and one non-Hispanic female from Pennsylvania).

Focus group participants were shown a short video of various Asian-American depictions in the media (e.g., actor John Cho’s depiction of Harold from the recent film Harold and Kumar Go to White Castle and the character of Hideki played by actor Bobby Lee in MadTV’s Average Asian sketch). Afterwards they were prompted to discuss their personal experiences growing up as their race/ethnicity and also their perceptions of any issues facing those of Asian ethnicity.

The most important issues that emerged from the focus group session were: (1) the challenge and negative implications of attempting to meet high expectations or demands of parents, peers, and society; (2) the tension that exists when a person’s self-concept does not align with societal or individual stereotypes that explicitly or implicitly label the person, including seemingly positive labels such as ‘smart’ or ‘good at math’; (3) limited possible selves as a result of stereotypes; and (4) a tendency for Non-Asians view Asians as a form of ‘perpetual foreigner’ that is unable to assimilate; the view that an Asian is an “alien” or “other,” i.e. not mainstream or normal.

From the survey and focus group results, game mechanics were created and embedded into two game prototypes created to incorporate the most important issues identified by the participants: Flying Asian Stereotypes! and A-Culture-Rate. The games were developed following an iterative paper prototyping design process (Fullerton, 2008). The following section will discuss details of the two game designs.

**Embedding game mechanics into game prototypes**

**Flying Asian Stereotypes! Game**

The Flying Asian Stereotypes! Game was designed as an open-ended ‘sandbox’ platform game intended to promote identity reflection and consideration of the implications of being labelled by stereotypes. Based upon Markus and Nurius’ (1986) notion of possible selves, the participant, playing as an Asian-American character in the game, must frequently make decisions throughout the game to determine what kind of identities he or she perceives to be realistic, desirable, or undesirable for himself or herself. These choices, which represent various strategies for identity refinement, affect the avatar’s appearance and abilities within the game.

**Basic Rules and Gameplay.** The basic gameplay is relatively simple. Specific stereotypes related to Asian-American identity are reified within the game as projectiles that are thrown towards the character. The player can choose to dodge or touch the stereotype projectiles, symbolising the avoidance or internalisation of stereotypes. As stereotypes collide with the character, the player can see the effects of these stereotypes; the character’s appearance changes accordingly and gameplay is affected (e.g., in-game behaviour and how the player is spoken to). For example, if the player is hit with
‘Parental Pressure’, then the character’s movement becomes slower as a result of less freedom and control, and he or she is constantly told to study harder or that their academic performance is not good enough. If the player chooses to become a ‘Nerd’, then the character is viewed as nerdy (e.g. avatar takes on thick glasses) and is constantly told remarks (e.g., presented with common microaggressions or microinvalidations (Sue, et al., 2007)) about Asian intelligence. Other stereotypes and forces within the game, based upon the literature review and from survey and focus group results, include ‘Model Minority,’ ‘bad leaders,’ ‘lacks social skills,’ ‘knows kung fu,’ ‘perpetual foreigner,’ ‘low self-esteem,’ ‘evil gangster,’ ‘bad romantic partner,’ etc. (e.g., Lee, 1996; Mok, 1998; Lee & Zhou, 2004).

As a ‘sandbox’ environment, the game world is open-ended in the sense that there are many ways to play. There is no predefined win or lose condition; the player can choose to create any identity as he or she wishes. No one solution is clearly better than the other, so the game is designed intentionally to allow players to reflect upon their self-concept, to explore different kinds of identities, and to decide how stereotypes may or may not play a role in their lives.

This first game design had three specific objectives: (1) allow for identity reflection and exploration; (2) educate players of all backgrounds about Asian and Asian-American issues by addressing common misconceptions and presenting facts; and (3) to give a simulated experience of what it is like to be labelled Asian stereotypes and assumptions that may not necessarily be true for the player.

**Design of Flying Asian Stereotypes! Experience.** Below are sample images from the game. Figure 2 depicts a simple set of instructions for how to play. Once the player begins the game, he or she is given a set of choices in the form of several blue ‘Identity Choice’ stars (Figure 3) that generally represent opposing traits (e.g. social skills vs. shyness) that correspond to stereotypes of Asian and American culture. Throughout the game, the player is presented with messages associated with the Asian stereotype with which the player has been labelled. In the screenshot below (Figure 4.), a stereotype (e.g. ‘Nerd’) approaches and the player must decide whether or not to allow each stereotype to label them. Depending on the stereotypes that have been activated, the player may see spoken messages such as “Do you know Kung Fu?” “You’re Asian? You must be good at math!” “How come you’re so smart?” “You’re a bad romantic partner,” or several other messages associated with each stereotype.
Because there is no right or wrong way to play, players are free to explore the environment and to reflect upon their own identity goals as they create various hypothetical identities. Players can also earn ‘happiness points’ by collecting smiley faces, although being hit with low self-esteem or parental pressure can lower one’s happiness score. Five lesser known facts about Asian culture, specifically chosen to debunk common stereotypes regarding Asian culture, were distributed throughout the environment (represented by the green letter ‘F’). The five facts address the following: (1) the innate diversity of Asian countries, comprising 47 countries each with its own unique traditions, customs, history, and values; (2) the perpetual foreigner (unassimilable alien) phenomenon; (3) the unanticipated consequences of the model minority image, increasing pressure and masking the problems and needs of underperforming Asian students (including some members of Southeast Asian groups); (4) the “bamboo ceiling” phenomenon; and (5) relatively high rates of suicide and depression for Asian-American women (see Figure 5 below for an example of an in-game fact).
Figure 4. Player may avoid or touch the ‘Nerd’ stereotype that is moving towards avatar.

Figure 5. Facts about Asian culture.

The game is meant to be educational for both Asian and Non-Asian players. For Asians, it is meant to promote reflection of one’s identity and the role stereotypes have played in their lives, with the goal of helping them come to terms with the stereotypes. For Non-Asians, the game offers a new experience of seeing what it may be like to be labelled various Asian stereotypes that may or may not be true for an individual.
Design Propositions and Game Mechanics for Flying Asian Stereotypes! Game. Based on previous pilot studies, four specific design propositions were tested in order to generate “theories-in-action” (Sandoval & Bell, 2004) about the Flying Asian Stereotypes! Game:

1. Letting people construct and enact identities relevant to ethnic stereotypes in an ISG can impact one’s self-concept positively.
2. Making stereotypes explicit is good for letting people take ownership of these stereotypes.
3. Awareness of possible selves via avatar play is good for identity support.
4. Challenging one’s assumptions is good for learning.

The following game mechanics, based upon theory, were embedded in the Flying Asian Stereotypes! Game:

1. Create new identities (based upon Possible Selves theory (Markus & Nurius, 1986) that are realistic, desirable, or undesirable selves, through Identity Choice stars and stereotype projectiles.
2. Address Sue et al. (2007)’s notion of racial microaggressions (in the form of microinsults and microinvalidations) that are launched at the player.
3. Gameplay (e.g., ability to move around in the environment quickly) affected by various aspects of Asian-American experience found in the literature, such as parental pressure, high rates of suicide, low self-esteem, etc. (Wang & Lin, 2005; Lee, 1996; Cheryan & Bodenhausen, 2000).

The following section will describe the design of the second game and present the results of how participants played each game.

The A-Culture-Rate Game
The second game, A-Culture-Rate (Figure 6) was based on the themes (from the focus group session and survey responses) of societal “otherisation” and Asians as perpetual foreigners, unable to assimilate or be perceived as mainstream or normal. The goal of the design was to deliver an experience that conveyed the consequences of otherisation,
and getting a person to realise that it is not easy or beneficial to determine how acculturated a person is based upon physical appearance. As with the first game, participants felt that this game should be kept light-hearted and fun in order to make the issues of race and stereotyping more approachable while still being effective.

**Basic Rules and Gameplay.** The game design used a guessing mechanic that asked participants to guess acculturation scores and biographical information for ten people of Asian descent. Each in-game person was assigned acculturation scores based upon the Suinn-Lew Asian Self-Identity Acculturation (SL-ASIA) Scale (Suinn, 2010; Suinn, 1987). The game was intended to let players recognise their biases and stereotypes related to acculturation by letting them guess a person's acculturation level and their personality traits, and then revealing what the person is truly like (i.e., their true acculturation score and a biography written by the person himself or herself).

**Design of A-Culture-Rate Experience.** Sample images from the game are shown below. Figure 7 shows the basic gameplay of the game. The player is presented with ten people, one at a time, and he or she determines the acculturation level of the person (based upon the SL-ASIA scale) by clicking on a number from 1 to 5. The player also enters in a yellow box a short description of their assumptions about the person based upon their physical appearance.

![Figure 7. A-Culture-Rate gameplay.](image)

Immediately after rating each person, the player is given feedback on the person’s true SL-ASIA acculturation score. If the player guesses the value correctly, he or she is given 100 points. If the player guesses incorrectly, the player loses a certain amount of points that corresponds to how close they were. For example, if a player guesses “5” but the person was actually a “2,” then the player loses 300 points for being off by 3. At the end of the game, the player is shown each person’s true biography compared to the text that they wrote for each person (e.g., Figure 8). Thus, the player is able to clearly see how their assumptions compare with reality.
Figure 8. Feedback allows players to compare their assumptions of people with their actual autobiographies.

**Design Propositions for A-Culture-Rate.** Specific design propositions were tested in order to generate “theories-in-action” (Sandoval & Bell, 2004) about the *A-Culture-Rate* Game:

1. Allowing people to fail and make mistakes can be good for learning.
2. Immediate feedback allows players to get general a sense that realise their assumptions of another culture may be wrong.
3. Making assumptions explicit and then challenging them is good for learning about Asian-American culture.

The game design attempted to determine the best way for people to realise how their own assumptions may not be accurate. Various game mechanics, integrating theory, were embedded in the *A-Culture-Rate* Game:

2. Articulate assumptions about people and combating stereotypes by debunking these assumptions.
3. Reflect upon one’s ability to guess acculturation level, before and after the game.
4. Viewpoints (a game score) to provide feedback about a player’s ability to accurately rate acculturation level.

**Phase Two: Play-test and Data-Gathering**

Upon designing and developing the two games, twenty-eight undergraduate students (21 male, 7 female) were recruited from a large public university for user play-testing and data collection. Participants were recruited using a purposive sampling strategy to obtain participants in three categories based on Asian acculturation level: (1) ten high acculturation second generation Asian-Americans, (2) four low acculturation first generation Asian immigrants, and (3) fourteen Non-Asians with minimal Asian experience. The *SL-ASIA* instrument (Suinn, 2010; Suinn, 1987) was used to determine
the level of Asian acculturation for each participant. Phase Two consisted of multiple data sources: pre- and post- tests, real-time feedback in the form of think-alouds and server-side game logs during gameplay, and focused semi-structured interviews (see Figure 9, below). This section will discuss the data collected during Phase Two.

![Figure 9. Study procedure.](image)

**Pre- and post-test items**

An online pre- and post-test was designed to capture shifts in three areas: (1) knowledge of Asian culture, (2) perceptions and attitudes towards Asian issues and stereotypes, and (3) perceptions of self-identity in relation to stereotypes. The knowledge questions were fact and content-based, exploring the accuracy of participants’ knowledge of Asian-American issues and culture. Perceptions/attitudes questions explored dimensions including perceived empathy and self-reported attitudes regarding specific stereotypes. Self-concept questions investigated perceptions of their identities, self-esteem and pride in one’s ethnicity, and the role of stereotypes (e.g. how much they perceive specific stereotypes as applicable to their lives).

Pre- and post-tests had 95 items. In terms of format, pre- and post-test questions were broken down into the following manner: thirteen open-response items, twenty-eight 7-point stereotype differential items (i.e., a technique introduced by Gardner et al., (1972)) that explored participants’ level of belief of a stereotype’s truthfulness pertaining to Asian-American men (e.g., rating Asian-American men on the a 7-point scale “not smart—smart”); twenty-eight stereotype differential items that explored one’s self-concept in relation to stereotypes; and twenty-six 7-point Likert scale type items. In terms of content, questions broke down into five questions that tested factual knowledge about Asian culture (e.g., “How many Asian countries are there in the world?” to test understanding of Asian diversity); 43 questions (28 stereotype differential and 15 Likert scale items) that explored perceptions of Asian culture (e.g., “Asian-Americans are good at computational fields like math, science, or computers”); 33 questions (28 stereotype differential and 5 Likert scale-items) that explored perceptions of self-identity; and 14 miscellaneous questions that addressed perceived impact and aspects of the design. The variables encountered in the analysis are listed in Table 2, below.

**Table 2. Variable descriptions.**

<table>
<thead>
<tr>
<th>Independent Variables/Covariates</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acculturation Level</td>
<td>1=Non-Asian; 2=High Acculturation; 3=Low Acculturation</td>
</tr>
<tr>
<td>preQ1</td>
<td>Mean scores of the items on pre-test involving knowledge of Asian culture</td>
</tr>
<tr>
<td>preQ2</td>
<td>Mean scores of the items on pre-test involving perceptions/attitudes towards Asian culture</td>
</tr>
<tr>
<td>preQ3</td>
<td>Mean scores of the items on pre-test involving perceptions/attitudes self-identity</td>
</tr>
<tr>
<td>Dependent Variables</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>postQ1</td>
<td>Mean scores of the items on post-test involving knowledge of Asian culture</td>
</tr>
<tr>
<td>postQ2</td>
<td>Mean scores of the items on pre-test involving perceptions/attitudes towards Asian people/culture</td>
</tr>
<tr>
<td>postQ3</td>
<td>Mean scores of the items on pre-test involving self-identity</td>
</tr>
<tr>
<td>diff1</td>
<td>Difference from pretest to posttest in terms of knowledge of Asian culture (postQ1-preQ1)</td>
</tr>
<tr>
<td>diff2</td>
<td>Difference from pretest to posttest in terms of perceptions of Asian culture in relation to stereotypes (postQ2-preQ2)</td>
</tr>
<tr>
<td>diff3</td>
<td>Difference from pretest to posttest in terms of self-identity (postQ3-preQ3)</td>
</tr>
</tbody>
</table>

Participants were given pre-tests in paper format. Completion of the pre-test took approximately 25-30 minutes per person. Within one to two weeks of completing the pre-test, individual participants were invited to play the two games. Participants were instructed to think aloud their thoughts, feelings, reactions, and reasoning process as they played. Using a server-side PHP script and ActionScript 3.0 code, server-side game logs also captured game play behaviour. On average, participants spent about forty minutes playing both games.

Participants were instructed to play Flying Asian Stereotypes! three rounds, each time constructing a different kind of identity. Each identity construction corresponded to each of the three aspects of possible selves theory; i.e., “ideas corresponding to hopes, fears, standards, goals, and threats” of what a person might become, would like to become, and are afraid of becoming (Markus & Nurius, 1986, p. 954). The first time, the student played the game as though the avatar was a realistic portrayal of himself or herself; i.e., while constructing an identity within the game, choices were made within the game based upon how he or she saw himself or herself in real life. The second time, he or she constructed an identity of a person he or she is afraid of becoming (a feared self). Finally, during the third time, the participant constructed an identity that they would like to become (an ideal self), even if not necessarily who they are in reality. Following this game, participants played A-Culture-Rate once.

After playing the games, participants were given a post-test (in the form of an online survey) that very closely matched the original items on the pre-test. This post-test took approximately 25-30 minutes per person. Finally, participants were given semi-structured interviews that explored the content within the games (e.g., “Was anything surprising as you played this game?” or “Did you learn anything from this game?”). Participants were also asked general questions about the role of stereotypes in their lives, thoughts on self-concept and Asian culture, design feedback, and how to improve usability and user experience.

**Results and Findings**

This study focused on three primary research questions: (1) Do ISGs affect Asian students’ perceptions of self-identities in relationship to stereotypes? (2) Do ISGs promote new perceptions and understandings of Asian culture? Finally, (3) Are ISGs effective in educating players about facts regarding Asian culture and stereotypes? This section will present these findings from the study.

First, pre- and post-tests were analysed for general trends within and between groups. 38 of the Likert-scale items were reverse-coded in order to prepare them for analysis. After completing analysing the quantitative data, qualitative data was analysed using a maximum variation sampling approach (Patton, 1990). Open coding and a thematic
analysis of interview data was performed. The following section will discuss in greater
detail the findings from this study.

1. **ISGs provided new understandings of self.**
   To investigate the research question: *do ISGs affect Asian students’ perceptions of self-identities in relation to stereotypes?* The 33 items on the pre- and post-tests were analysed to see whether the mechanics found within the games shifted perceptions of self-identities in relation to stereotypes. To consider differences between the three groups, a fixed effects Analysis of Covariance (ANCOVA) model was applied with mean scores of the items on pre-test involving self-identity as a covariate to reduce the variance.

### Table 3. Results of ANCOVA model

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-0.071</td>
<td>0.1316</td>
<td>14</td>
</tr>
<tr>
<td>2</td>
<td>0.009</td>
<td>0.3479</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>0.250</td>
<td>0.1364</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>0.003</td>
<td>0.2503</td>
<td>28</td>
</tr>
</tbody>
</table>

Tests of Between-Subjects Effects
Dependent Variable: *diff3* - Difference from pretest to posttest in terms of self-identity

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected</td>
<td>.897a</td>
<td>5</td>
<td>.179</td>
<td>4.966</td>
<td>.003</td>
<td>.530</td>
</tr>
<tr>
<td>Model</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>.999</td>
<td>1</td>
<td>.999</td>
<td>2.732</td>
<td>.113</td>
<td>.10</td>
</tr>
<tr>
<td>Group</td>
<td>.335</td>
<td>2</td>
<td>.167</td>
<td>4.631</td>
<td>.021</td>
<td>.296</td>
</tr>
<tr>
<td>preQ3</td>
<td>.077</td>
<td>1</td>
<td>.077</td>
<td>2.123</td>
<td>.159</td>
<td>.088</td>
</tr>
<tr>
<td>Group * preQ3</td>
<td>.318</td>
<td>2</td>
<td>.159</td>
<td>4.403</td>
<td>.025</td>
<td>.286</td>
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<td>Error</td>
<td>.795</td>
<td>22</td>
<td>.036</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1.692</td>
<td>28</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. R Squared = .530 (Adjusted R Squared = .423)

The pre-test scores indicated that high acculturation second generation Asian-Americans (Group 2) had the highest score (M2 = 4.55), followed by Non-Asians (Group 1) (M1 = 4.44), and then low acculturation first generation Asians (Group 1) with the lowest (M3 = 3.94), which suggests high acculturation Asian-Americans initially had the highest relative awareness of how stereotypes played a role in their self-identities before playing the games. Upon playing the games, the Estimated Marginal Means EMM table and plot indicated that Group 3 (low acculturation Asians) had the highest change in self-identity (M3 = 0.18), followed by Group 2, or high acculturation Asian-Americans, (M2 = 0.10), and then Group 1, or Non-Asians (M1 = -0.076). Thus, the ANCOVA model, controlling for individual scores on the pre-test, revealed that first generation Asians had the highest change in self-identity, followed by the second generation Asian-Americans (significant interaction effects between acculturation level and pre-test items involving self-identity, F(2,22) = 4.40, p < 0.05, ηp2 = 0.29). As expected, Non-Asians had virtually no change in their self-identity.
Table 4. Estimated marginal means.

<table>
<thead>
<tr>
<th>Group</th>
<th>95% Confidence Interval</th>
<th>Mean</th>
<th>Std. Error</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>-.076a</td>
<td>.051</td>
<td>-.183</td>
<td>.030</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>.103a</td>
<td>.065</td>
<td>-.031</td>
<td>.238</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>.180a</td>
<td>.195</td>
<td>-.224</td>
<td>.584</td>
</tr>
</tbody>
</table>

a. Covariates appearing in the model are evaluated at the following values: preQ3 = 4.410.

Themes that emerged from semi-structured interviews also supported the finding that players were able to learn new understandings of themselves. In several instances, players were able to reflect upon self-identities, verbalise goals and possible/future selves; for instance, Qing (names have been changed to pseudonyms), a first generation Asian male, discussed realisations and self-reflections from playing the games:

I learned about myself, especially when I played the second game, [creating] who you don't want to be, and I kind of liked to explore myself. I don't want to be pressured by my parents, I don't want to have low self-esteem, and I don't want to be shy. I want to be social. So I think I learned those things from the game. (Qing, emphasis added)

Asian-American players were able to identify with the stereotypes and issues raised in the game. For example, Evan, a second generation Asian-American male, described a greater sense of self-empowerment and ownership over stereotypes after playing the games:

Low self-esteem I hate that, really, a lot. I think I suffer from that too... I do suffer from low self-esteem...Yeah, family pressures are pretty high...I guess it's more important for me to be independent if I were to take care of my family...[the game experience] gives me more motivation to disprove Asian stereotypes. I've always had that motivation, but it makes me want to change things more now. [Have] more initiative and try to not be defined by my school so much. (Evan, emphasis added)

2. ISGs promoted new perceptions and understandings of Asian culture.

To answer the second research question, do ISGs promote new perceptions and understandings of Asian culture? A paired-samples t-test was conducted on the 43 items on pre- and post-tests to compare perceptions of Asian culture before playing the games vs. after the games. There was a significant increase in the scores from pre-test (Mpre=3.74, SD=0.38) to post-test (Mpost=4.08, SD=0.43) conditions, t(27)=4.39, p < 0.0001. An increase in score indicates a shift away from believing stereotypes are universally true or accurate for Asians. These results suggest that the games help participants understand Asian stereotypes in a more nuanced, less essentialist way, and that they are not universally true (e.g., there may be individual differences).

To test for differences in perceptions of Asian culture between groups, a fixed effects Analysis of Covariance (ANCOVA) model was applied with the mean scores of pre-test items involving perceptions of Asian culture as a covariate to reduce the variance. The ANCOVA model, which examined perceptions of Asian culture in relation to stereotypes, controlling for individual scores on the pre-test, revealed significant interaction effects between Group (level of Asian acculturation) and preQ2 (pre-test items that explored perceptions and understandings of Asian culture), F(2, 22) = 3.91, p < 0.05, ηp2 = 0.26. Group (level of Asian acculturation) was also found to be
significant, $F(2,22) = 4.21$, $p < 0.05$, $\eta^2 = 0.28$. To see which group scored higher, the Estimated Marginal Means (EMM) were inspected, which were adjusted to take into account the effect of the covariate (pre-test scores).

The EMM table and plot indicated that lower acculturation first generation Asians (Group 3) had the highest change from pre to post ($M_3 = 0.69$), followed by Non-Asians (Group 1) ($M_1 = 0.37$), and then higher acculturation second generation Asian-Americans (Group 2) ($M_2 = 0.23$). Thus, low acculturation Asians shifted their perception of the accuracy of Asian stereotypes the most, followed by a smaller shift by Non-Asians, and a still smaller shift by higher acculturation second generation Asian-Americans. Originally, in the pre-test, Group 3 held the highest mean value for perceptions of Asian culture in line with stereotypes ($M_3 = 3.88$), followed by Group 1 ($M_1 = 3.83$), and then Group 2 ($M_2 = 3.55$). Because Group 3 had the highest change and Group 1 had the lowest change, this may suggest that prior to gameplay, awareness of existing stereotypes were lowest for low acculturation Asians while high acculturation Asian-Americans were the most aware of the presence of these stereotypes.

Qualitative data from semi-structured interviews also supports the finding that participants gained new perspectives on Asian culture upon playing the games.

Yeah, I learned stuff about the suicide rate. I think I heard things about that before, I never thought about it though. And then the family pressures, I know a little bit about that just from talking to kids that are Asian. And I never really thought about, how it's a common stereotype that people think Asians are smart, but it talked about the Laos and Cambodians were some of the most disadvantaged Asians, and I never really thought about them as Asian, but they are. It just shows how you don't really know much unless you do your research. (Roger, Non-Asian male)

The suicide rate was very interesting, something I’d never think of. The other one, the one about Asians being more successful, but how some are actually in poverty, was really interesting…I think given the facts that were presented, yes, I think my stereotypes, what I think of what someone is a typical Asian changed a little bit. (Jake, Non-Asian male)

3. **ISGs effectively educated players about facts regarding Asian culture and stereotypes**

To answer the third research question, were ISGs effective in educating players about facts regarding Asian culture and stereotypes? A paired-samples t-test was conducted to compare knowledge of Asian culture before playing the two mini-games versus after playing the mini-games. There was a significant improvement in the scores for pre-test ($M_{pre}=3.44$, $SD=0.82$) and post-test ($M_{post}=5.01$, $SD=0.81$) conditions; $t(28)=6.95$, $p < 0.00001$. These results suggest that the mini-games have a positive effect on learning facts regarding Asian culture. Acculturation level of the participant made no difference in terms of learning.

Evidence from semi-structured interviews also suggests that participants learned facts and surprising items related to Asian culture and stereotypes. For instance, Sam, a Non-Asian undergraduate male remarked:

I definitely learned from the facts. The suicide one was a big one for me. I mean, you don’t hear about suicide that much in the news, generally. Especially regarding the female Asian community. Especially between 15-24, I would have thought it would not be that big of a deal. (Sam, Non-Asian male)
Participants gain a better understanding about the inherent diversity in Asian countries. For instance, in response to the idea that there are several Asian groups, each with their own unique values, cultures, and traditions, Roger stated:

I really thought it was interesting, I think I put [on the pre-test] like 10 countries were Asian, but there were more like 40 something, so I would say I think I just would think of China, in Asia, I didn’t think of all those other countries where it’s not like that. I would say I definitely learned that. (Roger)

User Experience, Redesign and Next Iteration of DBR

Importantly, participants expressed that aspects of identity that could often be serious, such as personal goals, fears and desires were made into a fun, less-intrusive format. None of the participants indicated that the games were uncomfortable, negative, boring, or uninteresting. In fact, nearly all participants described the experience as “fun” or “cool,” e.g.:

I think those two games are really good…The games are fun. (Qing)

The *A-Culture-Rate* Game, I could seriously see people playing this just for fun. I…like how at the end, you can learn about them. (Amber)

I think this game is pretty cool. I think it’s well done. I think it…was a pretty cool learning experience. (Evan)

This finding demonstrates that more serious issues of race, identity and self-concept—including ideal and feared selves—can be explored in a game format in nonthreatening ways that are perceived to be fun and effective for learning.

Discussion and Significance

The purpose of the study was to explore whether game mechanics could be designed within interactive, simulated experiences to help participants understand and support their self-identities, focusing on Asian-American culture as a starting point. The ability to promote reflection of individuals’ self-concepts and goals while overcoming stereotypes can ultimately lead participants closer toward identity achievement and broadening possible selves, important outcomes for a generation of learners who are confronted with difficult pressures, expectations, and limiting social forces during adolescence.

Experiences in digital games can also be a powerful way for a person to learn and better understand the nuances, values, and challenges of another culture – a valuable outcome in today’s increasingly multicultural, interconnected world. As a relatively safe environment to experiment and receive feedback, it allows individuals to articulate their assumptions and realize misconceptions and biases they may not be aware of. While playing ISGs, Non-Asian players demonstrated greater empathy and more sophisticated, nuanced understandings of the Asian-American experience and culture, including the implications and unintended repercussions of stereotypes that may seem positive (e.g., the consequences of the Asian “Model Minority” stereotype). Asian players were able to articulate new understandings about their self-identity, including how stereotypes have played a role in the past and present in terms of goals and choices. These reflections and understandings are particularly important for helping youth overcome
barriers and limiting forces that may pigeonhole their career trajectories, ultimately broadening their possible selves for the future.

This work is important to the field of the game-based learning for several reasons. First, this study provides preliminary work on how games can be useful as a methodological tool for self-identity research and data collection. This study demonstrates how game mechanics can be designed to make them well-suited to capture aspects of identity in a less-intrusive way, including identity and role play, and turning goals, fears, and desires into in-game actions into a series of meaningful choices. Second, it serves as an important example of how games can be used for purposes beyond mere entertainment or content delivery, and instead having greater connections with social phenomena in the real world. Some researchers have explored or called for a larger discourse on how digital games teach or reinforce aspects of race, gender and/or sexuality (e.g., Kafai, Cook & Fields, 2010; Leonard, 2006; Leonard, 2003; Nakamura, 2001). This work, instead of reinforcing stereotypes in the ways found in many popular commercial games like Grand Theft Auto (e.g., DeVane & Squire, 2008), attempts to allow players to understand, take ownership over, and combat stereotypes.

More importantly, the study provides a case study for how games can serve as an intervention for learning scientists, and various forms of psychologists: clinical, counselling, social, and developmental. This work can be easily adapted to explore the consequences of stereotypes and faced by members of other ethnic minority groups, women in science, technology, engineering, and mathematics fields, etc. All people, not just members of minority groups, often are impacted by stereotypes or some form of discrimination; therefore, this work has implications for groups far beyond Asian-Americans.

Several limitations regarding this work need to be discussed, many of which have to do with the nature of design-based research. As common with other design-based research projects, it is difficult to fully determine what combination of features of the intervention actually contributes to its success. A vast amount of different forms of data was collected and the presence of multiple variables including contextual factors makes the identification of specific kinds of causality harder to pinpoint. Triangulation of research data using both quantitative and qualitative methods (e.g., ‘thinkalouds’ and interviews) was one strategy taken to attempt to account for this. Another limitation to the study is regarding the issue of generalizability. As a DBR study, generalisation is also difficult to make across contexts, although those who are creating game-based interventions for similar or other historically underrepresented groups can benefit from the lessons learned from this study. The results of this study prepare the way for future work; future studies, for example, could explore how this kind of games-based approach compares with traditional media (for example, text-based or video-based approaches) in their ability to shift perceptions of one’s identity, empathy, learning and understandings of a culture.

In the design, development, and evaluation of the impact of Identity Supportive Games, the researcher has attempted to demonstrate that digital games can be created to deliver simulated experiences that can get a person to understand one’s self-concept and aspects of a culture that may be different than one’s own. As educational researchers and practitioners are tasked with preparing youth for a global economy, improved cultural understandings and support for identity development are two of the most important challenges that learning scientists need to address if students are to rise above barriers such as stereotypes and self-imposed constraints on possible selves; only then will students reach their highest potential.
References


**Biographical statement**

*Joey J. Lee, Ph.D.* is a Research Professor of Technology and Education at Teachers College, Columbia University. Lee is the Director of the Real-World Impact Games Lab. He designs, develops and studies innovative game-based approaches to education. His projects address real-world problems like sustainability, cross-cultural issues, and motivation and engagement for learning. For more information, visit www.gameprof.com.

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