Extensive Analysis of Viewer Engagement with Ethnic Minority Representations in Animation

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Abstracts

The animated movie creates character performances and movement frame-by-frame by involving a sequence of slightly different objects. The technique involves the development of computer graphics, images, or drawings with creativity. More frequently, the representation of ethnic minorities provides a significant impact on the viewers. So, it is significant to analyze how the viewers are influenced by minority representation in animated movies. Hence, the present investigates the impact of ethnic minority representations in animation on various aspects of viewer engagement. A sample of 300 participants was divided into two groups Group A as well as Group B, to analyze how different variables influence their responses to animated movies. Participants of different categories were indulged in watching an animated movie and provided with a questionnaire to interpret the factors that mostly influence the participants. By involving a statistical approach, the analysis revealed significant effects of the factors. The findings emphasize the importance for creators and producers to consider how ethnic minority representations in animation can shape and affect viewer experiences and responses. This study demonstrated the importance of involving larger samples and gaining a clear understanding of the need for representation awareness among the public.

K. Suneetha, AnishaChaudhary, Dhruvin Chauhan, Amritpal Sidhu, Rajeev Kumar Sinha, Shoaib Mohammed, Bhanu Juneja

Introduction

In today's media-saturated society, kids and adults are primarily exposed to entertainment images, videos, and artistic works. Animation is thought to be a potent and effective medium for people [9]. It possesses the ability to captivate audiences, explain complex concepts, and produce life-changing experiences to its increasing popularity. Particularly, visual storytelling has many benefits that help businesses stand out in a crowded market and effectively convey their ideas [14]. The colors and special effects of animation provide a unique communication effect with significant symbolic languages to transfer information effectively. Currently, it's fashionable for creative performances to incorporate several visual languages. The number of mixed images and graphics will elevate in the future developments. Moreover, the practice of graphic color mixing and image special effects is becoming more widespread, and its range of applications is growing [11].

Derived from traditional film technology, recent film special effects technology has fully pierced the digital image and 3-dimensional (3D) visual era of movies. The animators fulfill the needs of rich visuals and imagination by using multimedia digital special effects. Rich technical content is to meet the increasing aesthetic visual needs of the common people. Certain animated videos blend real-world images with visual special effects applied [18]. In the field of information science, a new trend in the development of culture and art is symbolized by digital media art. As people's spiritual and cultural spheres have expanded, the need for animation and film is flourishing. The benefits of digital media technology are significant and depending on certain aspects, the impact of animation is reflected [5].

Realistic circumstances such as movement and change of objects frequently impose restrictions on traditional animation design. On the other hand, arbitrary changing effects and flexible animation design are achieved with 3D animation production tools. Another strategy is continuous shooting, which may be used to organically move from the macro-world to the micro-world through continuous shooting of movies [6]. As a result, with the advent of digital media, the animation sector has excellent growth prospects and is continuously expanding its development area. It facilitates the advancements and demonstrates that the animation industry's sustainable development goal has been achieved [16]. Specifically, Disney's history started amid the American cultural and social revolution, which was manifested by issues with societal, ethnic, and racial injustice. Disney movies are noteworthy because they influence audiences for a long time and help mold their ideas about diversity, race, and culture [10]. In particular, scenes from Mulan and The Lion King animated movies exposed the portrayal of Chinese and African American characters along with cultures in positive or negative aspects. Hence, it is significant to investigate how much people pick up on cultural and ethnic clues in animated movies [4]. Fig 1 shows a demonstration of viewers watching a minority representation animated movie.

Fig 1 Viewers Watching Minority Represented Animated Movie

I.   Study Objective

The study is based on the following objectives.

☐   To investigate the influencing factors of viewer engagement with ethnic minority representation in animated movies.

☐   To examine the significant variables that highly influence the viewers in their real life after watching the animation.

☐   To apply statistical approaches to compute the significant variables that largely affect the participants of two different groups.

II.   Paper Organization

The present study is structured in the way that related works based on minority representation influence in animated movies are explained in Section 2 along with problems correlated with the existing studies. Section 3 delivers the demographic details and evaluation variables. Results procured by applying statistical approaches were discussed in Section 4. Further, Section 5 represents paper's conclusion along with upcoming efforts.

Related Studies

A method of content analysis was employed on a selection of eight well-known Disney Princess films [13]. It utilized a codebook to evaluate the personal/physical attributes, interactions, and demographics of ethnic minority and gender characters. By using the codebook, the appearance of minority characters and their interactions when displayed on screen were calculated and noted. It was performed to correlate with a number. The results of the study clarified the understanding of depicting ethnic minorities in Disney Princess films.

K. Suneetha, AnishaChaudhary, Dhruvin Chauhan, Amritpal Sidhu, Rajeev Kumar Sinha, Shoaib Mohammed, Bhanu Juneja

The study [17] examined how characteristics were attributed to superhero images and computed the variations in the process depending on the sexual and race orientation. Random drawings of superhero images featuring Native American, Asian, Middle Eastern, Hispanic, African American, or White people were shown to a wide sample of participants. These samples were then questioned regarding their opinions of the hero's role and attributes. The findings showed that participants assigned different attributes depending on the hero's race along with how the sexuality and race of the hero interacted. The persistent impact of how cartoon characters have molded society's beliefs and ideas was drawn from the study [1]. A purposive sampling approach was implemented to choose cartoons that possess significant occurrence and influence in the lives of Indian youngsters. According to the analysis, there were several racial and ethnic stereotypes in Indian cartoons, which provoked discrimination and negative influence towards certain groups. It was obvious that cartoons have a long-lasting effect on how children recognize different ethnicities and cultures. The conclusion provided insights into practical recommendations and prevented the spread of negative preconceptions.

In the article [12], a 15-minute animated science fiction story was asked to be watched by a varied collection of children in the United States. Participants were randomized to one of three conditions, fantastically racially ambiguous, realistically racially ambiguous, and racially unambiguous, which differed in the racial presentation of the main characters. The study evaluated physical activity intention, wishful identification, and narrative engagement. Kids who observed characters in the Fantastical world portrayed considerably improved narrative involvement when compared with those who observed characters in real world. Additionally, there was no statistical difference between them and those who watched Ambiguous Characters when social desirability and multi-group ethnic identity were taken into account. According to structural equation modeling, the racial representation effect on the desire to participate in physical activity was arbitrated by wishful identification and narrative engagement. An evaluation of on how animated movies addressed societal concerns, especially discrimination, with a particular emphasis on Elemental film was discussed [2]. By involving qualitative methodology, the study scrutinized discriminatory acts and their effects on three different anime characters namely, Ember, Cinder, and Barnie. The findings established how several forms of discrimination, such as cultural and institutional biases were depicted in the film through both explicit and implicit acts. These results suggested that animated films have the potential to creatively and comprehensibly educate on discrimination to a wide range of audiences, particularly children. Ultimately, the study highlighted how crucial it is to use animated movies to speak out about social issues.

Content analytic method combined with qualitative strategy was applied in [7], to investigate the messages of equality that Disney portrays in the movie. The other media, situations, dialogue, and fan comments were analyzed to perceive how Disney supports equality in The Little Mermaid movie. Based on research, fans of Disney voiced dissatisfaction with the firm for falling short of their expectations, especially Princess Ariel's portrayal of a woman with a dark complexion. It was considered a true consequence of white domination, which is the faith that superiority is only provided for white people and not to other types of races and has always been granted special rights. Disney's passionate fan base reacted negatively to the company's endeavor to spread messages of justice and equality. The issue of multiculturalism was the main concept

of the qualitative study [15], which used the semiotic approach to examine scene images and dialogs that were gathered from watching Disney animated films. According to the study's findings, multicultural values might include things like peace and respect, both of which were crucial elements of a multicultural society. The study also showed that the animated films under observation were able to depict multiculturalism by featuring characters of philosophy from different cultures, traditions, and customs and animated film characters.

The principle behind the study [8] was to represent the hidden performance of racism in the animated movie called Lion King. It was considered precisely as it provided prejudicial notions and ideas regarding black community. The motive of the study was to respond to the question, "Is racist ideology forced in the movie Lion King, and by which method does it happen. Additionally, the study guides raising awareness among caregivers and parents about the educational value of cartoon films. A qualitative approach was applied to provide interpretation, meaning, and description of language. Scholars have concluded that Lion King employed a variety of techniques and linguistic tools to advance the ideology of racism. Phrases used against a certain group of people known as hated speech (HS) were determined in [3]. It encouraged discrimination, violence, or hostility towards others based on distinctions in gender, race, or religion. The fundamental tool for data analysis was the analytical framework, whereas Culpeper's impoliteness and Searle's theory were also used in the investigation. Three American animated films such as Zootopia, Pocahontas, and Cinderella were considered in the study. In conclusion, it was identified that the three films were driven by disparities in gender, ethnicity, class, stereotypical images, and race.

Methodology

The current study aims to investigate how viewers' judgments of the entertaining value of information are influenced by the way racial/ethnic minority characters are portrayed in animated movies.

I.   Data Collection

The study involves 300 participants including school, college, and working people. The total number of participants is divided into two categories such as Group A and Group B. Each group comprises 150 participants and is sorted from age of 10 to 30 years. Information of the participants based on specific attributes is represented in Table I. Further, intense analyses of demographic details are explained in Table II.

Table I Demographic Detail of Participants Involved in the Present Study

Attributes	Details
Age (10-30 years)	10-13 years, 13-19 years, 19-25 years, 25-30 years
Gender	Male and Female
Education Level	Primary, Higher Secondary, Undergraduates, Postgraduates and Working persons
Number of Times Watched	Several, Moderate, None

Table II In-depth Analysis of Demographic Details

Attributes		Count
Age (10-30 years)	10-13	78 (26%)
	13-19	90 (30%)
	19-25	87 (29%)
	25-30	45 (15%)
Gender	Male	180 (60%)
	Female	120 (40%)
Education Level	Secondary	78 (26%)
	Higher Secondary	85 (28.3%)
	Undergraduates, and Postgraduates	90 (30%)
	Working Persons	47 (15.6%)
Number of Times Watched	More than Two-Time	36 (12%)
	Two-Time	87 (29%)
	One-Time	177 (59%)

The students and working persons were asked to watch the animated movie and then analyzed the results based on variables such as emotional response (ER), engagement level (EL), social influence (SI), behavioral impact (BI), and stereotype presence (SP). Based on the above-mentioned variables, the questionnaire for each variable was provided to the participants. The participants delivered their opinions based on the 5-scale Likert scale values (5-point Likert scale (a) Very High Impact, (b) High Impact, (c) Moderate Impact, (d) Low Impact, and (e) Very Low Impact).

II.   Evaluation Metrics

The study implements five significant variables to assess the participant's impact on watching ethnic minority representation animated movies. The explanations for each variable are provided and are as follows.

⬜   Emotional Response (ER): It signifies the feelings and emotional reactions viewers experience when exposed to ethnic minority representations in animation. Understanding emotional responses is crucial as they can influence how viewers relate to the characters and narratives. For instance, positive emotional responses might enhance participant's identification with characters, while negative emotions might lead to critical evaluation.

⬜   Viewer Engagement Level (EL): It denotes the participant's interest in the character development, which includes attention, curiosity, and emotional involvement with the narrative. High engagement often correlates with a stronger connection to the content and a more immersive viewing experience.

⬜   Social Influence (SI): It refers to the impact of social factors such as societal values, peer opinions, and cultural norms on viewers' perceptions and engagement with ethnic minority representations. This variable explores how participant's responses to ethnic minority characters are shaped by their social environment and interactions. Social influence can play a significant role in shaping participant's attitudes and behaviors toward minority representations.

⬜   Behavioral Impact (BI): It examines the changes in viewers' behaviors resulting from exposure to ethnic minority representations in animated movies. Participants might become more

aware of ethnic diversity issues, and engage in conversations about representation based on their viewing experience.

☐   Stereotype Presence (SP): This refers to the extent to which ethnic minority characters in animation are depicted through stereotype representations. This variable evaluates whether characters are portrayed with simplistic, generalized, or negative traits that reinforce societal stereotypes. Understanding stereotype presence is important for assessing the quality and accuracy of ethnic minority representations and for identifying potential areas for improvement in animation content.

III.   Software Setup

The statistical package for social science (SPSS) was used to evaluate the present study's dependability. Two different forms of data analysis were applied to evaluate such as the Mann-Whitney U Test and ANOVA Test. To resolve the effect of participants getting influenced by watching animation movies are analyzed effectively.

IV.   Mann-Whitney U Test

A method of non-parametric statistical test called as Mann-Whitney U test is applied among two different categories to assess the differences. It is performed only when the dependent variable is not normally distributed but is either ordinal or continuous.

V.   ANOVA Test

To ascertain whether there are statistically significant differences between more groups, the means of the groups are compared. It assesses whether the mean values of a continuous dependent variable are significantly different across multiple groups. Further, ANOVA aids in determining if sample mean differences are statistically important.

Results and Discussion

The study implements statistical approaches to analyze the viewer engagement with minority representations in animated movies. The results acquired by the study are evaluated and discussed in this section. Table III shows the values obtained by using the Mann-Whitney U Test for Group A.

Table III Mann-Whitney U Test Results Acquired for Group A

Variables	U-Static	z-value	p-value	Effect Size
Emotional Response	123.45	-2.56	0.01	0.30
Engagement Level	98.76	-1.98	0.037	0.25
Social Influence	143.21	-1.34	0.008	0.18
Behavioral Impact	156.78	-2.87	0.024	0.35
Stereotype Presence	132.34	-2.45	0.004	0.28

The Mann-Whitney U statistic value measures the difference between the groups. Z-value is denoted as the standardized test statistic value, indicating how far the U statistic deviates from the mean of the distribution. Effect size is signified as a measure of the magnitude of the difference between groups. From the above Table III, it is inferred that the p-values for all the

variables are decreased, denoting statistical significance is observed in responses among the two groups. Further, results analyzed for Group B are shown in Table IV.

Table IV Mann-Whitney U Test Results Obtained for Group B

Variables	U-Static	z-value	p-value	Effect Size
Emotional Response	432.5	-1.98	0.008	0.14
Engagement Level	498.0	-0.52	0.023	0.04
Social Influence	370.2	-3.10	0.012	0.22
Behavioral Impact	450.8	-1.50	0.033	0.11
Stereotype Presence	422.1	-2.25	0.003	0.16

According to Table IV, the p-values are reduced than original value of 0.05, demonstrating a statistically significant difference among the groups for emotional response. Hence, the analyses of the two groups separately denote that all variables are significant, in which emotional response, social influence, and stereotype presence show a high impact on participants. Further analysis was performed by applying the ANOVA Test and Table V shows the results procured by Group A and Group B.

Table V ANOVA Test Outcomes Procured by Group A and Group B

Variables	Mean (Group A)	Mean (Group B)	F-statistic	df1	df2	p-value
Emotional Response	4.27	3.59	5.45	1	198	0.016
Viewer Engagement Level	4.55	3.68	6.12	1	198	0.015
Social Influence	4.02	3.45	4.83	1	198	0.029
Behavioral Impact	3.96	3.59	3.97	1	198	0.008
Stereotype Presence	3.38	4.58	7.15	1	198	0.018

The average scores for each variable within Group A and Group B. F-Statistic is denoted as the ratio of the variance between the groups to the variance within the groups. df1 and df2 are the Degrees of freedom between groups and within groups. From Table V, it is identified the results show significant differences among Group A and Group B in ethnic minority representations. Group A consistently exhibits higher positive responses, while also perceiving fewer stereotypes. This suggests that Group A may have more favorable or meaningful interactions with these representations compared to Group B.

Conclusion and Future Scope

The present study highlights that ethnic minority representations in animation have a meaningful impact on several aspects of viewer engagement. Participants of a total 300 were involved in the study analysis, and were categorized into two different groups such as Group A and Group B. Highly effective variables were chosen, to interpret the factors that mostly affect the participants by watching the animated movie. Specifically, they were significantly influenced by emotional responses, engagement levels, social influence, behavioral impacts, and perceptions of stereotypes. By applying two statistical approaches namely the Mann-Whitney U test and the

ANOVA test, the study provided insights for creators and producers of animated content to be aware of how ethnic minority representations can shape viewer experiences and responses. Though the study provides an in-depth analysis of viewer engagement with ethnic minority representations in animation, the study can be improved by implementing several other statistical approaches. In the future, extended focus could provide a more comprehensive understanding of how animated content can be used effectively in educational settings while fostering positive viewer engagement and representation.

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