Impact of Advertising on Educational Apps Used by Children:
A Parental Perspective

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ABSTRACT

India's education sector is being impacted by COVID-19 in unprecedented ways. The pandemic is disrupting the traditional education system, affecting over 320 million students. This sector is trying to develop robust, innovative approaches to foster a paradigm shift toward digital education. These efforts are being supplemented with the launch of quality-focused multilingual educational applications (apps). Parents are also swiftly adopting a variety of e-learning apps. This research addresses the role of advertisements to empower parents to be educated consumers for educational apps for children. The purposeful sample data were collected from 307 parents of students from the top 10 ICSE (Indian Certificate of Secondary Education) and CBSE (Central Board of Secondary Education) schools in Urban India. The findings indicate that advertising media accelerates the diffusion of educational technology and apps among parents. However, it does not help in overcoming insecurities that parents may have regarding these apps for their children.

KEYWORDS

Children, Digital Learning, Education, India, Media, Technology

INTRODUCTION

India is known to have one of the most extensive education systems following the "Nursery to HSC structure"—a prototype that covers formal education over sequential levels ranging from preprimary, primary, and secondary schooling, followed by preuniversity education till the 12th grade. With the number of enrolled students reaching as high as 260 million per year, over 70% of these students have access to smartphone and other devices, and this proportion will likely continue to increase.

The access, availability, and penetration of usage of the Internet in the Indian demographic present a unique opportunity to use the smartphone as an educational learning tool through a mobile application that can reach millions of students spread across the populous country. This creates the potential to solve the age-old dilemma of the education industry finding a way to traverse the Indian market. A KPMG's (2017) recent report suggested that the growth momentum of Internet users in India at compound annual growth rate18% will surpass the growth by English users (who are increasing at 3% to reach 199 million) by reaching 536 million in the year 2021. It has also been found that users speaking languages specific to India will also comprise 75% of the country's Internet user base

("Indian Languages"). However, the penetration is higher in urban India compared to rural India (The Internet and Mobile Association of India & Nielsen, 2019).

The lockdowns caused by COVID-19, the availability of low-cost smartphones, the penetration of mobile Internet, and the affordability of broadband are some of the triggers fostering the use of technology for online education delivery. Among Indian children between the ages of 9 and 17 years, 62.4% living in urban areas spend approximately four hours a day using the Internet on a mobile phone ("Telenor India's WebWise report," n.d.). The government is promoting online education by introducing platforms, including SWAYAM (which means "self" in Sanskrit and is the acronym for Study Webs of Active-Learning for Young Aspiring Minds) and Rashtriya Madhyamik Shiksha Abhiyan (RMSA). Various mobile and Web applications (apps) have also been launched, including Unacademy, Upgrad, Byju's, Meritnation, Extramarks, Topper, Vedantu, and Khan Academy, indicating that the scope of online education in India has evolved. These mobile apps vary in expertise and scope. Because of their effectiveness and impact, they are expected to be transformational.

According to Nielsen ("Mobile kids," 2017), 45% of children were provided with a mobile service plan at the age of 10-12 years. With the growing smartphones addiction, direct interactions between parents and children are on the decline. On a daily basis, an average Indian consumer uses over 43 apps and spends around 3-4 hours on various apps (Sydow, 2018). Urban Indian children aged between 9 and 17 devote over four hours a day on the Internet through their mobile phones ("Telenor India's WebWise report," n.d.).

In order to enhance the development and prevalence of the distance education market, various government initiatives are being adopted, including technology-based education techniques, such as e-learning and m-learning. By 2021, it is expected that, in India, the online education industry will be close to $2 billion ("Telenor India's WebWise report," n.d.). India is also projected to have accumulated over 735 million Internet users by 2021. Along these lines, Indian parents are becoming increasingly predisposed towards paid learning education apps (Choudhary, 2020). Due to affordable costs, ease of availability, and improving Internet connectivity, the popularity of smart mobile devices is on the rise, in India. Smart mobile phones are easy to carry and enable children to learn in unconventional settings (Ellingson, 2016).

Research indicates that apps can create "significant opportunities for genuinely supporting differentiated, autonomous, and individualized learning" (Shuler, 2009, p5), can boost the intellectual, and promote expression of emotions (Beschorner & Hutchison, 2013). However, to support quality learning, the choice of the right quality app is also required (Goodwin, 2013). In their report, Hirsh-Pasek et al. (2015) presented four principles to improve the educational value of the app which included that the apps are active in a way that requires intellectual effort, appealing, nondistracting, and meaningful, and they provide social interaction for the child.

For parents to excite their children about learning through creativity, fun, and entertainment, there is an increasing number of apps available today. Yet, the knowledge to select appropriate educational apps to improve the educational value is a daunting task, becoming a bigger and bigger challenge for parents. To add to the woes, there are time and money limitations to assess apps in the market to meet the educational goals for children (Hirsh-Pasek et al., 2015). Their inquisitiveness is dampened due to a lack of awareness, and thus clearly hindering the growth of the industry in India. Another factor is the influence of players apart from parents in the decision-making process, such as peers, teachers, and information on the Internet ("Mobile kids," 2017). In India, advertising media have played a pivotal role for governmental, nongovernmental, and corporate organizations to promote various larger initiatives and impact public attitudes. In India, there is huge potential for the advertising industry to create awareness and understanding for educational apps for children. Advertising has a pivotal role to play and help parents distinguish apps that are disguised as educational from those relevant and engaging apps that create an "educationally meaningful experience" for children.

This research is an attempt to emphasize the role of advertisements to empower parents to be educated consumers for educational apps for children and establish the impact of advertising media

on the diffusion of educational apps children use. The specific research question that the authors addressed is whether advertising helps parents adopt educational apps, build positive beliefs towards apps as learning tools, and overcome data security issues.

LITERATURE REVIEW

The Need for Advertising for Educational Apps

Information and communication are essential for the transfer of technologies for the enhancement of education. Franses and Vriens (2004) stated that there may be several cognitive, affective, and behavioral effects of advertising. Likewise, Vakratsas and Ambler (1999) recommended an elementary role of advertising in brand choice and sales. Their framework includes cognition (awareness), affect (image and brand positioning), and consumer behavior. To study the evolution of qualitative research and its consequences in terms of how it helps understand consumers, Maison (2019) investigated the effectiveness of advertising guides planning future marketing activities. Effectiveness can be measured on various other parameters; a majority of them analyze the degree to which advertising creates awareness among consumers, the extent of recall, the interest generated for the product, the trust established with the brand, and the degree to which the consumer's attitude and behavior toward a product or service changes. "A mobile application, most commonly referred to as an app, is a type of application software designed to run on a mobile device, such as a smartphone or tablet computer" ("Mobile app, 2021") and also referred to as smartphone app (Wikipedia, 2021; Yusop & Razak, 2013). Given the multitude of apps available on the market, there is a need to provide information about unique features, benefits, and precautions to parents for effective use of mobile technology. According to Emeeyou (2012), there are relatively few dependable sources available to evaluate the apps on children's education. In their research, Yelland and Gilbert (2011) recommended that parents should invest time to build familiarity with apps to safeguard the learning goals of their children. The choice of apps suitable for the child's age and cognition ability is quite a trying time for the interested parents (Henderson & Yeow, 2012). Thus, there is an unfulfilled need, namely that advertising and media can help parents to support decision making with respect to selecting apps for their children for learning and development. Specifically, advertising can help parents select quality apps, and provide a transparent and comprehensive guide at their disposal to select the most appropriate mobile educational applications. Consumer awareness activates the adoption or rejection of an innovation. (Rogers,1995). This leads to the first research question and hypothesis:

Research Question One: Do advertisements contribute to creating awareness about features, benefits, and price among parents for children's educational apps?

Hypothesis One: Advertisements for children's educational apps do not create positive beliefs towards features, benefits, and price among parents.

Diffusion of Innovations

Rogers' (2003) seminal work on adopter categories identified five perceived features that influence the rate of adoption of innovations: Relative advantage, compatibility, complexity, trialability, and observability. Based on Rogers' theory, Moore and Benbasat's (1991) research furthered understanding of consumers' perceptions towards adopting innovation in information technology (IT). Horsky and Simon (1983) worked on a model that integrates advertising and word-of-mouth marketing for new product diffusion. The study established that the firm, through advertising, could regulate advertising and sales to accelerate the diffusion process of the new product. During the initial period, the study demonstrated the need to advertise heavily to capture the innovators in the market and thereby contribute to word-of-mouth marketing.

Zhang (2015) studied the factors influencing the patients' acceptance of e-health innovations and the role of awareness in adopting e-health care facility for the diffusion of innovation. Considering that consumers experience adoption of messaging and ideas, it is important to communicate appropriately during this process, as per the progression of the diffusion and different groups of consumers (e.g., early majority, late majority, and laggards). Wu (2013) proposed the moderating effect of innovativeness on the relationship between extrinsic motives and mobile app usage intentions, and observed the impact of four constructs, viz innovativeness, optimism, discomfort, and insecurity on the usage of mobile apps. For parents to benefit from innovations in educational technologies, accessibility and knowledge to effectively utilize them in educating their children are critical. Advertising can be effectively used to create awareness, interest, evaluation, trial, and adoption for the diffusion of innovation for technology products such as educational apps in developing countries, including India. This leads to the second research question and hypothesis:

Research Question Two: What are the factors that affect the level of awareness for children's educational applications among parents?
Hypothesis Two: The use of celebrities in advertisements does not lead to higher levels of interest in children's educational apps among parents.

Educational Technology and its Benefits

According to the Association for Educational Communications and Technology (n.d.), educational technology is "the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources" (p. 1). Digital technologies have engulfed children as never before through the creation of immersive and interactive experiences on various smartphone gadgets, including mobile, tablet, and computers (Chen et al., 2014; Hirsh-Pasek et al., 2015.; Zaranis et al., 2013).

Chiong and Shuler (2010) observed a phenomenon known as "the pass-back effect." In these scenarios, parents "pass" their phones to their children while travelling, waiting in the queue or any such activity that requires disciplined behavior in social settings, or to engage them in something innovative that catches their attention and helps them learn a concept via a unique medium.

To successfully examine the functional, operational and educational benefits of the apps, the process is done by categorizing them according to the age of their audience, the subject on which they focus, and the classification of the pedagogical design of the application. Under the pedagogical design, specialized categories were created to classify apps as instructive, manipulative or constructive (Goodwin & Highfield, 2012).

In the context of using mobile technological devices as interventions in the educational industry, mobile devices are proven to be much more effective as compared to either a desktop device or the absence of a mobile device (Sung et al., 2016). The usage of mobile apps promotes experiential learning and self-directed learning. Likewise, informal educational environments with experience elevating elements, such as higher audio-visual engagement, colors, mnemonics, and phonetics, were more effective in terms of reach and efficient delivery of value, as compared to the conventional, formal methods. Furthermore, short-duration lessons were more successful than their long-form counterparts.

Kukulska-Hulme (2009) suggested that education policymakers working with mobile operators and other stakeholders can facilitate the transition from teacher-centred learning to learning that is increasingly initiated and managed by learners themselves, in collaboration with teachers and others

Hasan et al. (2016) found that mobile apps provide a positive perception to improve the learning system, and argued that this should introduce all kinds of resources and ensure sufficient knowledge among instructors. Beland and Murphy (2016) also examined the impact of smartphones on education.

In developing a scalable process to study the development of mobile education, there has emerged a platform known as i-CARES ("Management and Technology")—a six-step linear application studying

and developing a system that is based on Piaget's theory of cognitive development (Cherry, 2020). According to this theory, the sensorimotor stage (0-2 years old) is the age when children learn to explore their environment using their sensory and basic motor skills. Greenhow et al. (2016) studied the latent transformational power of digital technology in teaching and learning. In the educational context in developing countries, the scholars studied a wide variety of themes, such as the use of social media, digital communities, and distance learning. The research throws light on the disruption of traditional educational models for teaching, sharing, data privacy, and legalities. While mobile-supported learning may have certain advantages that render a much more enriching user experience compared to traditional methods, it does not assure a 100% successful positive learning experience (Krumsvic, 2010). Kaliisa and Picard (2017) assessed mobile learning in higher education in the African context to recognize the issues for diffusion of mobile learning technology for education. Lack of technological infrastructure, smartphones, negative beliefs among students and lecturers, and streamlined policies are identified as impediments. Moreover, it has been found (Okai et al., 2017) that the primary prerequisite for mobile learning to truly flourish as an industry in Africa is consistent and promising growth observed in the expanse of telecommunication industry. This will influence the prevailing mindsets that determine the culture and will support the usage of cellular devices, as per the unified theory of acceptance of use of technology model (Venkatesh & Zhang, 2014), which has proven to be an integral factor of analysis.

McCrae and John's (1992) five-factor model of personality is used to assess the responses of different people to receiving knowledge regarding privacy and information security systems programmed in the mobile applications (Grange & Park, 2017). For example, agreeable, open, and conscientious individuals are more likely to follow the given set of rules and regulations when running a mobile application; neurotic and extroverted people are more likely to break these rules.

Gilavand (2018) investigated the effect of using mobile educational apps in Iran to show that apps are effective tools that propagate academic achievement and effective learning among students in the shortest amount of time; thus, they can be labelled as new educational opportunities.

Beland and Murphy's (2016) study in four cities across England explained that, while engaging in technological communication may have its advantages in terms of enhancing the learning experience, it can also be a source of distraction. However, there is a higher chance of low-performing students getting distracted by mobile phones as compared to high-performing ones. Sung et al.'s (2016) empirical research also shows that, as a learning tool, mobile phones are very effective for education. Rogers' analysis of diffusion demonstrates complexity as an important factor deterring users' adoption of innovative services. According to Cunningham et al. (2005), risk perceptions in the online setting is primarily concerned with behavioural uncertainty and environmental uncertainty. Environmental uncertainty is linked to economic and privacy hazards, while behavioral uncertainty is linked to economic, personal, and service provider performance. Security, financial, psychological, physical, social, and privacy are among the most prominent risk factors scholars identified in research until the present date. Hence, this study hypothesises that a lack of comfort with technology use would make it difficult for parents to adopt educational apps. This leads to the third and fourth research questions and hypotheses:

Research Question Three: Does comfort with the use of technology impact the use of children's educational apps?
Hypothesis Three: There is no significant relationship between the time parents spend on the Internet and the desire for children to use educational apps.
Research Question Four: How can advertisements help to overcome insecurities related to privacy and learning?
Hypothesis Four: Advertisements have helped parents to overcome privacy and learning insecurities for the use of children's educational apps.

Based on the literature review, it is clear that research on the impact of advertising on consumer behavior towards educational apps requires further attention. To the best of the authors' knowledge, there are no published papers on the impact of advertisements on parents for children's educational apps in developing countries such as India, which have immense market potential for these resources. In addition to this, with amalgamation of smartphone apps ; studies on the diffusion of smartphones are available, but not studies on how users interpret and understand them (Lee & Lee 2014; Park & Ueda 2011).

Educational mobile technologies and apps are innovative and worthy of study within the framework of the role of advertising, since schools and parents are increasingly adopting this new method of learning. Despite the potential of apps to influence changes in education, there is very limited evidence of their foundation in advertising media.

RESEARCH METHODOLOGY

In this research, the authors collected qualitative data through organized, face-to-face and online interviews with 30 parents from Urban India to derive the final list of questions. During the interviews, the researchers noticed the parents' educational background, as well as their comfort and attitudes toward educational technologies, among other issues. The researchers used exploratory research to develop a better understanding of the situation, due to a lack of prior studies about advertising and educational apps.

The authors adopted diffusion of innovation theory (Rogers, 1995) for the development of the questionnaire, since this model includes the communication channels, influences of sociotechnical factors on adoption, the attributes of innovations, the characteristics of adopters, and the social system, which are critical for the acceptance of educational apps.

The researchers used nonprobability sampling technique for the selection of schools and convenience sampling for the selection of parents available to participate (voluntarily) and provide information. The researchers invited 400 pairs of respondents—800 parents with one child between 4 and 10 years old–to include the top 10 ICSE (Indian Certificate of Secondary Education) and CBSE (Central Board of Secondary Education) schools in Urban India, out of which 77% (307 pairs of parents) participated in the study.

DATA ANALYSIS

Reliability

Table 1 summarizes the data and number of cases. In the analysis, the researchers did not exclude any case from the sample. The reliability indicator value of Cronbach's alpha is 0.783 (N = 21), which indicates that the instrument the authors used to collect the data is reliable.

Hypothesis Testing

Hypothesis One

Null Hypothesis: Advertisements for children's educational apps do not create positive belief towards features, benefits, and price among parents.
Hypothesis One: Advertisements for children's educational apps create positive beliefs towards features, benefits, and price among parents.

The value for the t-test is 2.58 (Table 2). The t-value for the above three statements (i.e., 51.169, 51.739, and 41.442, respectively) are greater than the 2.58 . The significance value for the above is less than 0.05 (Table 3), thus, it is possible to reject the null hypothesis and the accept the alternate hypothesis.

Table 1. Summary of cases

		N	%
Cases	**Valid**	**307**	**100.0**
	Excludeda	0	0.0
	Total	307	100.0
aList-wise deletion was conducted based on all variables in the procedure.			

Table 2. Mean values for variables

Variable	N	Mean
Advertisements provide information: Options and features	307	2.58
Advertisements provide information: Benefits of apps	307	2.74
Advertisements provide information: Price and offers	307	2.24

Table 3. One-sample t-test results

Variable	Test Value = 0			
	T	df	Sig. (2-tailed)	Mean Difference
Advertisements provide information: Options and features	51.17	306	.000	2.58
Advertisements provide information: Benefits of apps	51.74	306	.000	2.73
Advertisements provide information: Price and offers	41.44	306	.000	2.23

Hypothesis Two

Null Hypothesis: Use of celebrities in advertisements does not lead to higher levels of interest in children's educational apps among parents.

Hypothesis Two: Use of celebrities in advertisements leads to higher levels of interest in children's educational apps among parents.

As Tables 4 and 5 shows, for degrees of freedom 3 and 303, the value of the F-test is 2.60. In the case of the first three variables, the F-values (i.e., 16.03, 20.87, 5.77, respectively) are greater than 2.60. The significance value of the first three statements is less than 0.05. This indicates that features and benefits are the most important dimensions, followed by prices/offers and brand name. Table 5 allows to deduce that the F-value (2.06) of the last statement is less than the 2.60. The significance value also is greater than 0.05. This indicates that the respondents do not consider brand ambassadors or celebrities important, so the null hypothesis is accepted.

Hypothesis Three

Null Hypothesis: There is no significant positive relationship between the time parents spend on the Internet and the desire for children's educational apps.

Table 4. Mean values for variables

	Importance of Brand Name	Importance of Features and Benefits	Importance of Price/Offer	Importance of Celebrity/Brand ambassador
Mean	2.32	3.28	2.97	1.66
N	307	307	307	307
Std. deviation	1.03	0.90	0.90	0.89

Table 5. ANOVA results

		Sum of Squares	df	Mean Square	F	Sig.
Importance of brand name	Between groups	44.54	3	14.85	16.03	.000
	Within groups	280.54	303	0.93		
	Total	325.08	306			
Importance of features and benefits	Between groups	42.10	3	14.03	20.87	.000
	Within groups	203.81	303	0.67		
	Total	245.91	306			
Importance of price/offer	Between groups	13.39	3	4.47	5.77	.001
	Within groups	234.40	303	0.77		
	Total	247.79	306			
Importance of celebrity/brand ambassador	Between groups	4.69	3	1.56	2.06	.106
	Within groups	230.08	303	0.76		
	Total	234.77	306			

Hypothesis Three: There is a significant positive relationship between the time parents spend spent on the Internet and the desire for children's educational apps.

The Pearson correlation coefficient value for these two variables is 0.72 (Table 6). This indicates a good correlation between the amount of time spent on the Internet in a day and comfort using online applications. The more time the parent spends on the Internet, the more the parent is comfortable using apps. Thus, the null hypothesis is rejected.

Hypothesis Four

Null Hypothesis: Advertisements have helped parents to overcome privacy and learning-benefit insecurities for the use of children's educational apps.
Hypothesis Four: Advertisements have not helped parents to overcome privacy and learning-benefit insecurities for the use of children's educational apps.

Tables 7 and 8 allow to deduce that the respondents feel that advertisements do not address any security or confidentiality-related issues, as the means are on the higher side for the variables. The mean for the second variable (i.e., compromise with privacy of user and data security) is also above

Table 6. Correlations

		Time Spent on Internet in a day	Comfort in Using Online Apps
Time spent on the Internet in a day	Pearson correlation		.72**
	Sig. (2-tailed)		.000
	N	307	307
Comfort in using online apps	Pearson correlation	.718**	
	Sig. (2-tailed)	.000	
	N	307	307

Table 7. Mean values for variables

	Does Not Address Security and Confidentiality	Compromise Privacy and Security
Mean	3.01	2.78
N	307	307
Std. deviation	0.93	0.98

2. To further investigate, the researchers conducted an ANOVA. The ANOVA results (Table 8) evidence that, for the statement "advertisements do not address security and confidentiality," the is 2.60. The F-value for this statement is 2.39, which is less than the critical value. The significance value is greater than 0.05, so the null hypothesis is accepted. For the statement "apps compromise privacy and security," the is 2.60. The F-value for this statement is 5.01, which is greater than the critical value. The significance value is less than 0.05, so the null hypothesis is rejected.

Out of the two statements, one statistically supports the null hypothesis, while the other does not. As a result, this statement requires further research to find out more about users' perceptions of educational applications regarding data security, confidentiality, and privacy.

Table 8. ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Does not address security and confidentiality	Between groups	6.05	3	2.02	2.39	.069
	Within groups	255.94	303	0.85		
	Total	261.99	306			
Compromise privacy and security	Between groups	13.74	3	4.58	5.01	.002
	Within groups	277.20	303	0.92		
	Total	290.94	306			

CONCLUSION

This research helped to understand the role of advertising media on the adoption of educational apps innovations based on the diffusion of innovations theory among parents in Urban India. The results

answered the research questions because they showcased that advertising educational apps helps create a relationship with the parents. The role of communicating the benefits, features, price, and other important information helps uplift perceptions of mobile education and convinces the consumers (i.e., parents) to convert their attitude. According to Rogers (Rogers, 1995), the adoption or rejection of innovation begins when "the consumer becomes aware of the product" and thereby brings about a positive change in terms of purchase decisions. The amount of time parents spend using the Internet is directly proportional to their desire to invest time and effort in educational apps for children. Complexity demonstrated by Rogers' analysis of diffusion as an important factor deterring users' adoption of innovative services is overcome by the time spent on the Internet that positively helps to get comfortable with technology use for parents to adopt educational apps. With increased penetration of smartphones and access to the Internet through the Digital India movement, an increased use of technology for engaging children is probable. The research also indicates that features and benefits are the most important dimension, followed by prices/offers and brand name.

However, the results only partially confirm the role of advertising media to overcome insecurities that parents may have regarding these educational apps for their children. The portrayal of celebrities does not have a positive effect on increasing interest or building trust among parents to consider educational apps. Thus, there is a need for developers and marketers to consider appropriate strategies to build trust, transparency, and value.

This study is quite important, since research indicates that apps can stimulate effective learning in early childhood, and the choice of the right app is also critical (Goodwin, 2013). This new technology on smartphones provides "significant opportunities for genuinely supporting differentiated, autonomous, and individualized learning" (Shuler, 2009, p.5). The use of technology can encourage the mental and emotional growth of young children (Beschorner & Hutchison, 2013). The key contribution of this research is that advertising media accelerates the diffusion of educational technology and apps among parents in India.

IMPLICATIONS

Demand for educational technology among learners in India is huge. Both governmental and nongovernmental organizations together can make a big difference in this space. This study has extensive implications for multiple stakeholders. The government and the policymakers need to understand consumer expectations from the ed-tech industry to uphold the independence and integrity of the education system. There is an immediate need to provide access, transform education at the grassroots, create security features, improve verification, and reduce plagiarism, among other factors. The next important responsibility is of the schools and teachers, the major influencers who can help in the diffusion of innovation. The last but not the least important role is of the marketers and advertisers to plan effective campaigns, technical events, and workshops, and implement a multipronged approach to create digital awareness and contribute to the easy adoption of ed-tech.

This research was restricted to parents of children studying in the top 10 schools in urban areas of Urban India with the dataset which included only CBSE and ICSE schools in India. Further analysis could go even deeper in India by examining whether cultural beliefs and societal norms have an impact on the results. A future direction for research by others would be to apply this methodology in sociodemographic variations and regional language apps in India. Future studies may be considered to understand the intervening factors of the role of exposure of parents with regards to technology and their beliefs towards advertisements.

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