



A Summary of Research on Flow Theory Based Interactive Mobile Advertising Design

Qiduan Chen^(✉) and Xiaojun Tang

Department of Art and Design, The Jimei University, Jimei, Xiamen, Fujian, China
1140751800@qq.com

Abstract. The digital age has seen interactive mobile advertising in abundance that centers on user experience. The flow theory, as is the study of psychology, can be an inspiration for knowledge about the user experience. This paper, with a review of the research development of flow theory and interactive mobile advertising at home and abroad, presents a detailed introduction of the research findings in flow theory. It carries out an overview of the research on interactive mobile advertising, highlights the relation and applicability of the flow theory to the interactive mobile advertising, and provides a research approach to the application of the theory to the mobile advertising.

Keywords: Flow Theory · User Experience · Interactive Mobile Advertising · Research Summary

1 Introduction

With the development of society, economy and information technology, it is the era of smart phones and 5th generation mobile networks now. According to the 49th Statistical Reports on Internet Development in China by China Internet Network Information Center (CNNIC), the mobile internet users has risen to 1.032 billion by December 2021, which marks the development towards interactive mobile advertising [1]. In comparison with traditional advertising, interactive mobile advertising relates more to the communication and interaction with the audience, and assigns more importance to their feelings and experience. However, besides its advantages, it faces a large number of problems in practice and needs improvement. It is a fact that interactive mobile advertising must need audience, and the flow theory, as is the study of psychology, can be an inspiration for knowledge about the audience experience. Based on the above, this paper, through a review of research findings of the flow theory and interactive mobile advertising, analyzes the applicability of the said theory to the advertising. It intends to expand the theoretical probability of combining them, and provides a reference for further studies of the application of flow theory to interactive mobile advertising.

2 A Review of the Flow Theory

2.1 The Origin and Definition

The flow theory was first proposed in the 1970s by Mihaly Csikszentmihalyi, a renowned American psychologist. He surveyed hundreds of people taking up different jobs, such as artists, musicians, athletes, and explorers, and found they would feel pleasant and fulfilled once they concentrated on a piece of work, and totally lost themselves [2]. And their emotional experience was as smooth as water flow. In 1990, Csikszentmihalyi published *Flow: The Psychology of Optimal Experience*, which gave such an emotional experience a definition, flow. The word referred to the optimal experience while being absorbed in an activity, with unawareness of the time [3].

2.2 The Factors for Flow

Research found in a flow experience, people of different age, profession, gender and education level manifested some common features. Csikszentmihalyi concluded 9 critical factors for a flow experience: clear targets, effective feedback, a match of competence and challenge, mental dedication and action, highly focused attention, a potential sense of control, weak self-consciousness, time unawareness, and deep engagement [4].

In the following decades, the factors have been through adjustment and developments as more research was conducted. Hoffman and Novak suggested there were three types of factors in the process of flow experience, i.e., the factors for the condition, emotional experience and result [5]. According to Chen et al., a flow experience had three stages, that is, the pre-stage, experience stage, and effect stage, which have been verified by empirical research [6]. The factors for condition and pre-stage of flow experience are clear targets, effective feedback, and a match of competence and challenge. By changing or adjusting the factors, a flow experience is easier to access. The rest of the 9 factors for flow experience are those for experience and result, and relates to a subjective part. In 1988, Masimini put forward a model of 4 sections, which was more applicable and comprehensive. The model demonstrated flow experience would depend on a match of high-degree competence and challenge [7].

2.3 The Present Status of Research

In the years following its definition first made by Csikszentmihalyi, the American positive psychologist, the flow theory has achieved progresses in a number of areas.

In 1996, Jackson presented his paper *Toward a Conceptual Understanding of the Flow Experience in Elite Athletes*, which studied the flow experience of elite athletes in specific sports, on the basis of flow theory [8]. In 1999, Mash H.W., and Jackson S.A. conducted in-depth research on the flow experience in athletics from different perspectives [9]. In 2003, Finneran and Ping Zhang proposed the PAT (person, artifact and task) model, in which the interaction between human and computers was conceptualized. In 2004, Csikszentmihalyi applied flow theory to business activities, which produced international influences [10]. In 2010, Tao Zhou et al. researched on flow theory and suggested flow experience be a key to mobile SNS (social networking site) users' loyalty [11].

The study on flow experience started approximately 30 years later in China than that abroad. The earliest work on it was the Chinese translation, by Xia Zhenping in 2001, of *Finding Flow: The Psychology of Engagement with Everyday Life* (by Mihaly Csikszentmihalyi, 1997) [12]. In 2005, Yu Lin and Zhang Dajun from Institute of Educational Science, Southwest University, first applied flow theory to studying internet addiction in adolescents in the 10th Academic Congress of Psychology [13]. In 2005, Deng Peng gave a brief introduction of the flow theory including its definition, research methods and model, etc., and pointed out the theory could be applied to design of educational and entertainment software, to make it highly attractive to users, and this would be a critical milestone in research on the application of flow theory to internet products [14]. In 2008, Yue Huaiwang et al. researched on the flow theory and the controllable factors for flow experience, and explored the application of the theory to industrial design of graphical user interface (GUI). It was an initial study of flow experience in the design field [15]. In 2015, Liang Dan et al. applied flow theory to mobile shopping design, to promote user experience and maintain the market value. The factors for condition of flow experience can be selected as design elements, such as clear targets, effective feedback, and a match of competence and challenge [16]. In 2016, Ou Xifan suggested the methods and guiding philosophy for interaction design according to the flow theory, such as smooth interaction and comfortable experience, and put them into practice in Baidu Micro Photo [17]. In 2016, Li Shuguang concluded the design methods and philosophy for internet products according to the flow theory, and implemented them practically [18]. In 2018, He Qiangkun and He Renke applied the theory to interaction design of mobile learning apps, for instance, clear targets, accurate feedback, a match of competence and challenge, to deliver high learning efficiency, amusement and flow experience to users [19]. In 2019, Lan Xinxin and Jiang Xiao built a flow model for mobile health apps on the ground of flow stages, which gave a reference for development and innovation of mobile health apps applying flow theory [20].

In summary, the research on flow theory first involved artistic creation and competitive sports, and now has been applied to educational research, online games, internet products, etc.

3 An Overview of Research on Interactive Mobile Advertising

3.1 Overview of Mobile Media

The media forms in a modern sense have been through developments, used to be newspapers, magazines, radios, TVs and the Internet. Now they grow into the “fifth media”, the mobile media integrated with media technology. With the advancement of mobile media technology, mobile media terminals have an increase of uses, and develop into digital assistants, such as smart phones, tablet computers, mobile TVs, of which smart phones have the most usage in the society. According to Statistical Reports on Internet Development in China, issued by China Internet Network Information Center (CNNIC) in August 2021, mobile network users have reached 986 million by December 2020.

In 2016, Zhou Yuyuan suggested in the light of characteristics of mobile media devices, for example, the device sizes and the sensors for means of interaction and usage scenarios, the information design for mobile media should consider factors such

as complex usage scenarios, limited device sizes, and touchscreen, etc., and the content design should have close attention on the page layout, information architecture and operation mode, etc. [21]. In 2015, Hu Qiongfang found besides the screen touch and voice recognition, mobile media came with technologies such as motion sensing, virtual reality, accelerometer, augmented reality, autostereoscopy, and wearable devices, etc., created multi-sensory, simulative, human friendly interaction, etc., and delivered ultimate user experience [22]. In 2021, Xu Rui concluded the communication across mobile media was free from restrictions of time and space, provided instantaneity and sound interaction, and the information communicated could be readily available at a low cost [23].

3.2 The Research on Interactive Advertising

With the development of media technology and improvement of living standards, the aesthetic part of information supply has changed. New media technology has been applied to producing interactive advertising that delivers multidimensional experience, fulfills emotional needs, and approaches needs. Interactive advertising, combining the inherent or associated features of different art, is characterized as hypermedia, and comprised of words, videos and audios. In *Interactive Advertising* by Liang Feng, interactive advertising was defined as “digital interactive media that supports instant adjustment, transaction, payment, and promotes customer feedback on the advertised products, services or ideas, in order to boost the mutual improvement of product sales and brand assets [24].”

Interactive advertising has an origin in US. Stephen J. Brown first explored interactive communication and researched on it. *Thoughts on Interaction Design* by Jon Kolko, an American philosopher in interaction design, based on the link of technology with humans, and design applications, probed into the influence of technology advancement and human action on design, and laid the foundation for development of interaction design theory. As the Internet developed, B. Barak noted in 2009 that interactive advertising featured interaction, supported by the Internet technology, which rendered convenience to the online life. He suggested interaction in advertising would be favored by the audience [25]. In 2011 Li Jia pointed out that interactive advertising, as a major approach of advertising for the future, should adapt to changes in the circumstance [26]. In 2016, Hu Xiaolin considered the H5 technology based “combination” of interactions as the key to innovation of interactive advertising, and it put the emphasis on branded design and humanistic services [27]. In 2017, Chen Lina, through analysis of features, superiority and common types of interactive advertising, put forward the idea that interactive advertising had informative, interactive, and innovative characteristics, etc., centered on interactive experience, and added great value to business and public welfare [28]. In 2021, Yuan Huaxin thought it was interactive advertising that stimulated the audience to get feedback from them, and promote brand advertising [29].

Thus, the traditional one-way communication failed to meet the needs in an era of Internet. Recent years saw more and more research on interactive advertising, with importance assigned to interaction in advertising communication.

3.3 The Research on Interactive Mobile Advertising

Interactive mobile advertising refers to the communication via mobile devices, using interaction technology to combine video, audio and words. It communicates advertising messages mostly to mobile phone users, and receives feedback from the audience on the information, services and ideas promoted. It is two-way communication in real time, which delivers a new informative experience, and fulfills the needs of both advertiser and users. In the age of digital mobile interactive advertising, lots of research has been conducted on it. Below the paper presents a summary of research on mobile interactive advertising.

In 2015, Wei Wei, through research on interaction in mobile advertising, analyzed the application of mobile media technology to creative advertising, probed into the coordination between creative advertising, artistic design and media technology, and worked out the connection between advertising creativity and development, and the principles for advertising design [30]. In 2016, Xia Choqun investigated interactive advertising on mobile phones, compared it with traditional interactive and Internet network advertising, and found the interactive advertising on mobile phones had the advantages of efficient feedback, cross-media interaction, and personalized communication, etc. [31]. In 2017, Hu Xieyuan and Zhou Feng analyzed the importance of user experience, and the interactive experience in interactive mobile-phone advertising, and explored the development of that advertising [32]. In 2020, Zhang Geng and Xiang Yang researched on H5 based interactive game-style mobile advertising, analyzed advertising cases from the perspectives of user experience, including sensory, feeling, thinking and relation experience, and summarized the design principles and strategies for H5 based interactive game-style mobile advertising [33]. In 2021, Xu Rui considered interactive intelligent mobile advertising featured directivity, delivered advertising messages according to user portraits, and allowed users to accept, refuse or block it. He thought it had a unique advantage, sending location-related advertising messages to users in the locations associated through positioning technology. In 2021, Qi Zhiqiao, through case study for interactive mobile advertising, analyzed the unique and common features of different types of interactive advertising, summarized typical characteristics of the types, classified interactive mobile advertising as “micro film”, game-style and functional H5 based advertising, and proposed design strategies for interaction, “function affordance” and user controllable rhythm [34].

Thus, interactive mobile advertising adopts digital technology to communicate messages. Compared with traditional advertising, it has interaction besides video and audio, and looks fun. With convenient mobile devices, interactive mobile advertising is easily accessible for people. Interactive mobile advertising assigns importance to user experience. With its interaction come creative design and open topics. This way it spreads among users, and communicates with more audience. There has been wide agreement on the value of interactive mobile advertising in China, with lots of marketing and design strategies proposed for it. However, as it is developing rapidly, it sometimes experiences quality problems. Under the current circumstances for social media, the benefits of interactive mobile advertising should be taken into consideration.

4 The Applicability of Flow Experience to Interactive Mobile Advertising

A review of a literature demonstrates that flow theory first involved the research on sports and education, and applied to interactive Internet products such as online gaming and shopping. Interactive mobile advertising is a new product on network, and centers on user experience. The definition of flow experience says the subject of flow experience is the research object of user experience. The excitement, engagement and sense of control are studied by the flow theory, which provide values and guidance to improvement of interactive mobile advertising. By analyzing the condition, experience and result for flow experience, and applying them to designing interactive mobile advertising, the mechanism for flow experience would be determined, user experience could be optimized, and advertising benefit can be maximized. Below is a summary of the factors for condition of flow experience:

- 1) The target factor of flow theory motivates users to focus on the target. In interactive mobile advertising, a clear target attracts the interest of audience, and gets them to be informed by advertising.
- 2) The match factor for flow experience inspires audience to accept challenges, and is a match of competence and challenge. A flow experience requires the audience to take complicated challenges. In interactive mobile advertising, such a match is stimulation and keeps the audience stuck to the advertising.
- 3) The feedback factor for flow experience avoids weakened or disrupted emotional flow, by supplying ways of response by users. In interactive mobile advertising, it allows users' feedback, keeps the flow rhythm, guides users to achieve targets, and reduces helplessness. Negative feedback gives users more experience, and raises the informative efficiency of interactive mobile advertising.

5 Conclusion

With the progress of mobile communication science and technology, there is a development towards diversified and multi-media interactive mobile advertising. This paper demonstrates the origin, definition, factors and research status of the flow theory, and presents a review of the research on interactive mobile advertising. It suggests flow theory can be applied to interactive mobile advertising to create pleasant experience for users. It would be an innovation for interactive mobile advertising, an improvement to it, which centers on user experience, to allow flow experience for users, fulfill their emotional needs, and produces more benefits and sound communication with them. However, the flow theory based interactive mobile advertising is still in research, with lots of issues remaining unsolved in practice. In the future, research of the advertising should be conducted on the ground of psychology and design science, and the employment of multi-disciplines and research methods should be enhanced, to formulate more accurate and effective optimization strategies for advertising design.

References

1. Statistical Reports on Internet Development in China [R/OL]. <https://www.chinanews.com.cn/>,2022-02-25.
2. Massimini, F.&Massimini., The systematic assessment of flow in daily experience, *Optimal Experience: Psychological Studies of Flow in Consciousness*, Cambridge: Cambridge University Press.
3. Bo Yanan, Research on APP experience Design of Preschool online Education based on flow Theory [D].2021, Shandong University. DOI: <https://doi.org/10.27272/d.cnki.gshdu.2021.002778>.
4. Csikszentmihalyi M, Flow: the Psychology of Optimal Experience [M]. New York: Harper Perennial Modern Classics, 2008.
5. Hoffman D L, Novak T P, Marketing in hypermedia computer-mediated environments. Conceptual foundations[J]. *The Journal of Marketing*,1996:50-68.
6. Chen H, Wigand R T, Nilan M S, Optimal Experience of Web Activities[J]. *Computers in Human Behavior*,1999,15(5):585-608.
7. Wu Xiaomei, Guo Chaoyang, Analysis of the concept and measurement of flow experience [J]. *Modern Management Science*, 2014 (4): 108-110.
8. Jackson S A, Toward a conceptual understanding of the flow experience in elite athletes[J]. *Research quarterly for exercise and sport*, 1996.
9. Marsh H W, Jackson S A, Flow experience in sport: Construct validation of multidimensional, hierarchical state and trait responses[J]. *Structural Equation Modeling: A Multidisciplinary Journal*, 1999.
10. Zhang Di. Research on short Video APP Interface Design based on flow Theory [D]. Hefei University of Technology, 2020. DOI: <https://doi.org/10.27101/d.cnki.ghfgu.2020.001803>.
11. Tan Zhou, Hong xiu Li, Yong Liu. The effect of flow experience on mobile SNS users' Loyalty [J]. *Industrial Management & Data Systems* 2010.
12. Csikszentmihalyi Mihaly. Xia Zhen Ping's translation. *Finding Flow: The Psychology of Engagement with Everyday Life* [M]. Shanghai Translation Publishing House, 2001.
13. Yu Lin, Zhang DaJun, A study on the relationship between Internet addiction and flow experience. Abstract of the 10th National Congress of Psychology, Chinese Psychological Society [C]. Chinese Psychological Society, 2005.
14. Deng Peng, Flow: experience the potential and fun of life [J], *Journal of distance Education*, 2006, 03:74-78.
15. Yue Huaiwang, Mon Renping, Meimei, Industrial graphical user Interface Design based on flow Theory [J]. *East China Jiaotong University*, 2008, 05: 59-62.
16. Liang Dan, Zhang Yuhong. Research on Mobile Shopping Application Design from the Perspective of flow experience[J]. *Packaging engineering*, 2015, 20: 84-87.
17. Ou Xifan, Tan Hao, Research on Internet Product Design based on flow Theory [J]. *Packaging engineering*, 2016, 37(04): 70-74.
18. Li Shuguang, Research on Internet Product experience Design based on flow Theory [D]. Southeast University, 2016.
19. He Qiangkun, who can. Research on interaction Design of Mobile Learning Application based on flow Theory[J]. *Packaging engineering*, 2018, 39(04):188-192
20. Jiang Lulu, Gong Sensen, Jiang Xiao, Research on Interactive experience Design of online Shopping platform from the Perspective of flow [J]. *Packaging engineering*, 201839(02): 214-218.
21. Zhou Yuyi, Research on audience experience Design of Mobile HTML5 advertisement [D]. Jiangnan University, 2016.

22. Hu Qiongfang, Research on Mobile Advertising pricing Model in Mobile Internet era [D]. Beijing University of Chemical Technology, 2015.
23. Xu Rui, Research on Interactive Creative Advertising Design based on Mobile [D]. Qingdao University of Science and Technology
24. Liang Feng, Interactive advertising [M]. Tsinghua University Press, 2007:3.
25. Win over Chenyang. Research on the Application of Mobile Interactive Advertising from the Perspective of immersion experience [D]. Zhejiang Industrial and Commercial University, 2018.
26. Li Jia. A probe into the Development of Interactive Advertising under Web3.0 Precision focus [J]. News knowledge, 2011(07):50–52.
27. Hu Xiaolin, Ma Zhenlong. Innovative thinking on “advantage Integration” of Wechat Interactive Advertising based on H5 Technology in interaction Design [J]. Packaging engineering, 2016, 37(24): 124-129. DOI: <https://doi.org/10.19554/j.cnki.1001-3563.2016.24.025>.
28. Chen Lina. Interactive Design of Digital Media Advertising based on Action experience [J]. News front, 2017(06):65-66.
29. Yuan Huaxin. Research on Interactive Advertising Design in the context of Digital Image [D]. Tianjin University of Technology, 2022. DOI: <https://doi.org/10.27360/d.cnki.gtlgy.2022.000392>.
30. Wei Wei, Research on the creativity and production of Mobile Media Advertising Games [D]. (Guangxi Institute of Fine Arts) Master’s thesis, 2015.04
31. Xia Chaoqun. Analysis on the present situation and Strategy of Interactive Advertising in Mobile Media-- taking Mobile Interactive Advertising as an example [J]. Television research, 2016(11):17-19.
32. Hu Xianyuan, Zhou Feng. Exploration of Interactive Mobile Media Advertising Design [J]. Design, 2017(01):24-25.
33. Zhang Geng, Xiang Yang. Research on Mobile Game Interactive H5 Advertising Design [J]. Design, 2020, 33(03):131-133.
34. Qi Zhi Qiao. Research on the interaction Design of Social Media Advertising on Mobile [D]. Beijing University of posts and Telecommunications, 2021. DOI: <https://doi.org/10.26969/d.cnki.gbydu.2021.002660>.
35. Zhao Jingjing. Research on Mobile Interactive Advertising Design based on Media context [J]. Packaging engineering, 2021, 42(10): 350-354. DOI: <https://doi.org/10.19554/j.cnki.1001-3563.2021.10.05>.

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