Journal of Theoretical and Applied Information Technology
31st August 2016. Vol.90. No.2

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

SOCIAL LEARNING APPROACH IN DESIGNING PERSUASIVE E-COMMERCE RECOMMENDER SYSTEM MODEL

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ABSTRACT

Intention to purchase in existing online business practice is learned through observation of information display by online seller. The emergent growth of persuasive technologies currently holds a great potential in driving a positive influence towards consumer purchase behavior. But to date, there is still limited research on implementing persuasion concept into the recommender system context. Drawing upon the principle design of persuasive system, the main purpose of this study is to explore social learning advantages in creating persuasive features for E-Commerce recommender system. Based on Social Cognitive Theory, the influence of personal and environmental factors will be examined in measuring consumer purchase intention. In addition, dimensions of social learning environment are represented by observational learning theory and cognitive learning theory. From those reviews, this study assumed that social learning environment can be created based on attentiveness, retentiveness, motivational, knowledge awareness and interest evaluation cues of consumer learning factors. Furthermore, the persuasive environment of recommender system is assumed to have positive influence towards individual characteristics such as self-efficacy behavior, perceived task complexity and confused by over choice. Findings from those reviews have contributed to the development of a research model in visualizing social learning environment that can be used to develop a persuasive recommender system in E-Commerce and hence measures the impact towards consumer purchase intention.

Keywords: *Recommender Systems, E-Commerce, Social Cognitive Theory, Social Learning, Persuasive Systems, Purchase Intention.*

1. INTRODUCTION

The design of a website is not only for fulfilling customer's needs and interest but is expected to assist customers through the steps of buying process. Thus, instead of simply seen as a brochure for online products, E-Commerce should therefore be a vital instrument of customer service and persuasion [1]. Currently, most outstanding E-Commerce do not just display the products which may influence user's needs, but the website actively recommends items that potentially interest users based on purchase history or similar user's preferences [2]. Amazon is a typical example of E-Commerce website which implements recommendation services that intelligently suggest items to that an active user may like. A survey shows that at least 20 percent of sales in Amazon come from the work of the recommender system [3]. In situations where there is an information overload, providing personalized recommendations has been proven to be a major source for enhanced functionality, user satisfaction, and revenue improvements [5].

According to [6] and [7], area of research in recommender system is being focused on the algorithm aspect or system-centered, which specifically looks on development and evaluation of the algorithm to generate the most accurate recommendations. But recently, the emerging research in recommender system is starting to be based more on user-centric characteristics. These include researches that focus on recommendation's presentation [8], system transparency which explains how the system work to the end user [7],

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

and recommendation's novelty and persuasion [9]. Scholar [10] stated that recommender system also can act as computer-human persuasion which may utilize some patterns of interaction that seem similar to social communication. Persuasion concept in E-Commerce recommender system is rarely explored. The opportunities to improve the quality of recommender system can be achieved through exploring the benefits of social influence in designing persuasive features. Thus, this study mainly aims to examine the persuasiveness of recommender system represented by consumer purchase intention and persuasive social features. For the purpose of creating a persuasive technology, [11] argued that computers can be more effective persuaders since they have capacity to adjust influence tactics based on developed situations and have a high level of interactivity compared to human ability. Moreover, user behavior plays an important role in determining the system works as it should in order to create the persuasive experiences via technology [12]. This includes either people are using the system in the intended way or even in an unintended way, it may provide learning opportunities that may further be integrated in future iterations of the system.

Theories of persuasion typically aim at studying influences or changes in behaviors and attitudes of people [13]. Scholar [14] suggested that socio-technical system can be designed by building upon user motivations and goals which then can influence their behaviors and attitudes. The understanding of fundamental aspects of human behavior is important as a requirement in applying social support features effectively for persuasive systems. In addition, the medium for channeling this understanding via persuasive systems needs to be devised to enhance positive user experiences and social interaction [16]. The evolution of user's participation is facilitated by social web through technological environment that engages diverse audiences, enhances creativity and fosters user collaboration, which then turns into active contributors [17]. Socially active people nowadays are surrounded with technological advancements including online purchasing from E-Commerce. Marketing competitiveness has resulted in consumers being confused over choices and information overload. Intention to purchase is learned trough social engagement and participation in online communities via numerous social networks. Learning can occur through the process of acquiring information from experience and information storing [18]. Social learning is one of the persuasive design principles which aim to motivate users to perform a target behavior by observing others' behavior through the systems [19]. Social cognitive theory by [20] is often applied in studies on individual behavior to elucidate the interaction among environmental factors, personal factors and behavior intention. Towards achieving the proposed research purpose as stated, the next section will discuss more on investigating how to create the persuasive environment of social features of recommender system. Review on social cognitive theory and consumer learning theory will be done. Moreover, the personal factors also will be examined and will be further linked with environmental factors and consumer purchase intention. The research model will be proposed to visualize the measurement for each factor discussed.

2. THE CONCEPT OF PERSUASIVE SYSTEMS AND BEHAVIOR CHANGE

Persuasive technology is defined as an interactive information technology which is designed for the purpose of changing behavior or attitude of the users [11]. The emergent growth of the Internet and other ambient technologies has opened up the opportunities for persuasion communication since the user can be reached easily. Some examples of application areas which have implemented persuasive technologies are healthcare, education, sustainability and E-Commerce. Persuasive systems are defined as computerized software or information system with the purpose to reinforce, shape or change the user attitudes or behaviors or even both [21]. From the definition above, there are three expected outcomes of persuasive system, namely voluntary reinforcement, shaping or change of attitudes and change or shaping or the behaviors. The concept of persuasion can be defined as communication process which includes message passing from persuaders to the recipient (persuadee) with the intention to influence recipient's behavior whilst leaving the power of making the decision to the recipient [19]. Moreover, system persuasiveness can be defined as user perceptions which concern on the quality of the systems, evaluation of system's features whether they meet the user's needs and expectation of system excellence [22], and the integration of system evaluation and its impact on the individual [23]. According to [11], the measure of system quality can be represented by their ease of access, usage easiness, error-freeness, convenience, system responsiveness,

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

information quality, system attractiveness, user loyalty and positive user experience.

The generic steps of persuasive system development are first starting with the analysis of persuasion context and selection of persuasive design principles, followed by requirement definition for software qualities, software implementation and behavior change [19]. Design principles of persuasive system (PSD) consist of four dimensions, which are primary task support, dialogue support, system credibility and social support. All those dimensions are proven to have significant impact on system persuasiveness and system qualities evaluation [24]. The primary task support can be defined as extrinsic IT task support which involves the usage if information technology is used as instrument in achieving the user goal. Besides that, dialogue support is related to system interactivity and its impact on increasing user motivation to achieve the target goals. System credibility is about the support process by making the system design more reliable and persuasive while social support is about incorporating a range of social influence for the purpose of motivating and persuading to perform a particular action or behavior. The range of social influence can be represented by social behavior benefits such as social learning, social facilitation, social comparison, normative influence, cooperation, competition and recognition. However, the design model does not suggest the implementation of all possible software features in creating the persuasive social systems.

Research from human computer interaction (HCI) perspective specific to E-Commerce context has mainly focused on designing website interfaces with the purpose of improving decision-making effectiveness and efficiency, which can lead a user towards intention to make a purchase from the Internet [25]. E-commerce websites are becoming increasingly functionally persuasive, and are incorporating increasingly dynamic persuasive techniques as similar to those applied by face-to-face sales-persons, to enhance system credibility, facilitate the process of online buying, and motivate users to adopt the systems [26]. An example of a persuasive technique, which is commonly applied on E-Commerce websites, is customer review boards, where each product is linked to reviews from previous consumers, allowing customers to compare alternatives. People who visit a website are assumed to have a certain goal; therefore presenting the appropriate content of the website is needed to enable them to achieve their goals. Online seller is responsible in triggering the user intention to care for information offered on the website and the same time if they can handle it. Moreover, responsibilities also go for the obligation to create the ease in accessing information and as intuitive to perceive as possible.

2.1 Social Cognitive Perspective\

Social Cognitive Theory is suggested by [27], which describes learning occurrence within social context. Moreover, learning can be influenced by personal factors and environmental events, which then result in pattern of behavior. All those factors operate as interacting determinants that influence each other [28]. Social Cognitive Perspective has been applied in various domains of human functioning such as choice of career and physical health but is very limited in the domain of persuasive systems. Research by [17] has proposed social cognitive model in investigating user engagement in feedback sharing that takes place in airport service. Social learning, social comparison and normative influence have been applied as software features in airport facilities to examine behavior change of travelers.

According to the above theory, the reciprocal interactions of personal and environmental events are assumed to have significant influence towards one's behavior. Environmental events can be represented by various models for the purpose of information extraction during consumer learning process. The way information is modeled to create persuasive environment of recommender system is the main research aim for this study. Besides that, consumer's personal factors such as perceived task complexity and confused by over choice due to information overload in online transaction are assumed to have positive influence towards persuasive environment. Consumer self-efficacy, which describes consumers' belief regarding their capability to succeed and attain a given level of performance, is assumed to have positive interaction with persuasive environment. This expectation is assumed to shape the process of consumer decision making, which includes the selection process of action and behavior taking. Taking the same concept as social cognitive perspective, this current study aims to explore the effect of personal and software features as environment factors towards the target behavior of consumer purchase intention in E-Commerce. Social learning approach will be used as software features to represent environment factor for this study. For this reason, the proposed social cognitive

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

model with specific measurement is designed in the next section.

2.2 Social Learning Dimensions

Social learning for persuasive system can be defined as the use of system to observe others' behavior and being motivated to perform the target behavior. Based on Social Learning Theory, concept of observational learning has been introduced, which stated that people retrieve behavior knowledge and skills by observing others, thus having direct influence on their own behavior [27]. An example of implementation can be seen in e-health application where a shared fitness journal in mobile application is provided for encouraging physical activity [32]. [33] in her work has proposed the main roles of social learning environments. These include supporting a learner in finding the right content, to connect with appropriate people and being a learner's motivation to learn differently but in effective ways.

Experiment using social influence features in persuasive system has been done and results claim that it has multiple positive impacts on user perceptions and behaviors [34], and the presence of others influence people's actions [35]. The main intention in designing software features with social learning environment is to visualize such a presence of other people that work toward a similar goal and interest. In achieving the similar situations or the same target goals, people are assumed to be able to be motivated by people that face the same issues and work towards the same directions. Design of social learning features should also consider the applicability of the system that enables the user to see the progress of their peers and make the others aware and being observant about their performance. An online learning environment can greatly benefit from the integration of recommender system to personalize the learning process and adapt it to the user's existing knowledge, abilities and preferences [36].

2.3 Observation Learning Theory

Previous studies have confirmed that consumer's purchase decision is influenced by observational learning activities of sales volume and reference of other's EWOM [49],[50]. According to [29], observational learning occurred through the process, which consists of attentiveness, retentiveness and motivational factors. Attentiveness is about the way information is modeled through salience, attractiveness and functional value activities to raise consumer attention. Retentiveness is about the way information is modeled to make it memorable. This can be achieved through symbolic representation and application [51]. Motivational factor is about the way information is modeled as incentive motivator to raise consumer motivation. This can be achieved through personalization of standard similarity and self-approved [52].

2.4 Cognitive Learning Theory

Cognitive learning theory holds the kind of learning which involves human problem solving that enables individuals to gain some control over their environment. This type of learning can occur through the statement that exhibiting knowledge and skills related to products [53]. The role of this learning factor is to show the cognitive information processing about product characteristics which disclose learning process and outcome of past buyers; hence stimulate the critical thinking of potential online buyers. Research by [54] has shown that others' opinions and reasoning may reduce consumer's cognitive processing efforts and energy expenditure and next improve the decision process of consumer. Model of cognitive learning stated that consumer learning process can be triggered through knowledge awareness and interest evaluation factors. Knowledge awareness can be created through the length of information, which consists of argument quality and participative cues. Meanwhile, interest evaluation can be achieved through consumer review of information and match their own knowledge and experiences with situations described as well as estimate their own learning curves.

3. STUDY DESIGN AND THE PROPOSED MODEL

Social Cognitive Theory has indicated that behavior intention may be influenced by environmental and personal factors. According to Ajzen, behavior intention is influenced by social norms through a user's attitude toward the behavior [46]. A subjective norm is known as the need for social pressure to engage or not to engage in a particular behavior. In this study, social norm will be represented by the system features of social learning, which is expected to have significant influence towards user behavior. The implementation of social learning environment in recommender system is also expected to bring persuasion context for each person's behavior. Besides that, the relationship scheme of social cognitive theory [29] has shown that the observed

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

behavior may be learned through the influence of personal factors. Personal factor is determined by individual perceived self-efficacy towards a specific behavior. As example, consumers are getting to believe that their ability in seeking the right information in online website will result in completing their decision about purchase intention. Behavior determinant is the response received by the user after performing the behavior.

Based on the review of those determinants from social cognitive theory, this present study aims to propose a model to investigate the appropriate factors which represent personal and environmental factors that will give a significant influence towards consumer purchase intention for E-Commerce recommender system. The concept of persuasion is represented by applying social learning dimension in environmental factor, which represents software feature for recommender system. Social learning dimension represents consumer learning theory of observational learning and cognitive theory. Meanwhile, personal factor is represented by consumer self-efficacy, perceived task complexity and confused by overchoices. Both personal and environmental factors for this study are believed to have a significant influence towards consumer purchase intention in recommender system that takes place in E-Commerce setting. The proposed model with those determinants is shown in Figure 1. The measurement and definition for those proposed determinants for the research model is further detail in Table 1.

Table 1: Operational Measurement and Definition

Factor	Attributes	Definition and Example
Personal Factor	Self-Efficacy	User belief regarding their capability to succeed and attain a given level of performance [37] - Shopping satisfaction - Frequency of use - Outcome expectancies
	Perceived Task Complexity	Task complexity is about a person-task interaction [38]. Task complexity is related to task and system's motivation. The value of completing the task (task motivation) is influenced by system's motivation that can be achieved through considerations of system's features [39]
	Confused by Overchoices	User feels difficult in making decision to choose and feels overchoice due to the power of influence and stores offered [40].
Environmental (social learning features)	Observational Learning Theory	Observational learning occurs when consumers observe the actions of others and make the same choice that others have made [49][50] Learning occurs through the process which consists of attentiveness, retentiveness and motivational factors [29]
	Cognitive Learning Theory	The cognitive dimension refers to statements exhibiting knowledge and skills related to the product [53]. Cognitive cues such as knowledge awareness and interest evaluation embedded in text

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

		messages provide critical information for potential buyers
Behavior Intention	Consumer Purchase Intention	In relation to consumer perception, behavior and attitude [44]. Purchase behavior acts as an important key point for consumers during product evaluation [55]. Purchase behavior will be driven by the physiological motivation which is related to the need of retail store in fulfilling their need [56]. Decision making style is related to mental orientation in characterizing consumer approach in making choices [45].

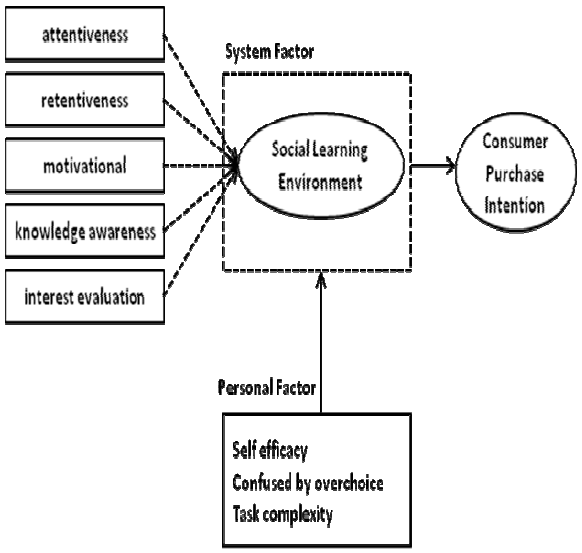

Figure 1: Proposed Research Model for Persuasive Recommender System

4. DISCUSSION

Even though the research on persuasive technology has been growing progressively, investigation in the context of E-Commerce recommender system still receives little attention. Besides that, self-learning behavior of consumer has opened up the opportunity for online sellers to leverage their consumer experience by designing an intelligent agent as a tool to persuade and assist users on the website. Based on the persuasion context of persuasive technology, social learning environment can be created to learn about others' behavior and being motivated to perform the same [17]. The proposed model in the previous section describes operational measurement which can be used to create a persuasive recommender system by leveraging social learning approach. Review on persuasive design principles has shown that social learning support can be used to create a persuasive environment to trigger user motivation to make purchase decision by observing their peers' behavior and history through the system. Consumer learning perspective of observational learning theory and cognitive learning theory is found to be important determinants in creating online learning environment for persuasive system. The way information is modeled based on attentiveness, retentiveness and motivational factors is assumed to be able to be used as important cues in creating social learning environment in recommender system. Besides that, cognitive factor such as knowledge awareness and interest evaluation is assumed to be important cues which can be embedded in information displayed to consumer.

Moreover, user characteristics such as self-efficacy, task complexity and being confused by information overload, are also proposed as personal factors which can influence consumer purchase intention from persuasive recommender system. Self-efficacy such as shopping satisfaction and frequency of use is found to be important determinants that trigger user motivation in making decisions about product purchasing. The main purpose of recommender tools is to assist consumer decision making by minimizing overload of information in terms of product choice and completing their online transaction from task complexity [5]. Thus, this study aims to investigate the influence of these personal factors towards consumer purchase behavior based on persuasive learning features of recommender system. Based on those reviews, this study further aims to validate the proposed personal, environmental and behavioral

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

factors in creating a persuasive recommender system. Quantitative research method will be used to conduct the survey among participants who have experience in online buying. Parallel with that, the survey instrument will be developed based on each determinant for validation purpose.

5. CONCLUSION

As conclusion, the quality of recommendation service can be improved through the evaluation of user-centric based [9]. Taking the recent advancement of persuasive technology, this study aims to enhance research discussion on recommender system development in triggering consumer purchase intention. Furthermore, this study is expected to fill the gap caused by limited research on implementing persuasion concept into E-Commerce recommender system. Previous research [48] has shown that consumer purchase intention is more influenced by their observation learning behavior, which proves that such environment for consumer learning support is important in present online business practice. Thus, the proposed research model is hoped to provide a lens for online seller in maximizing their marketing strategy in designing the persuasive features of recommender system to enhance their website credibility; hence influencing consumer purchase intention.

Taking social cognitive model as a basis, personal factor and environmental event is assumed to influence learning process, which results in behavior pattern of the consumer. Consumer purchase intention is measured by the influence of persuasive learning environment of recommender system. In addition, this study assumes that consumer characteristics such as self-efficacy, perceived task complexity and confused by over choice are the induced factors for persuasive design of recommender system. Review on social learning dimension has disclosed several important factors which can be used to design persuasive application features for E-Commerce recommender system. Practically, those learning features can be used by online sellers to recommend items which may enhance consumer motivation during their buying process. As an example, information about brand statistics is recommended to consumers, which then influences self-learning and purchase decision of the consumer

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